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Online Learning in Low-Tech Environments: What Works, What Doesn't?

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Abstract: The COVID-19 pandemic compelled all schools and colleges in India to shift abruptly to online learning to continue education for students. This study examines the contextual factors that supported or impeded online learning for middle-school students in India. The public schools included in the study were selected from 11 states. All of the schools had low-tech online learning environments. The three presences of the Community of Inquiry (COI) framework (Garrison et al., 1999) served as a theoretical lens to examine how contextual factors affected teachers' online practices and students' learning experiences. A qualitative study using interviews and focus-group discussions was conducted with students and teachers. The interviews with students were conducted using Participatory Learning and Action (PLA) tools and group discussions. Device accessibility, poor networks, and low competency with online teaching and learning technology inhibited both students and teachers. Students had difficulty accessing online learning and teachers had difficulty establishing effective online teaching practices aligned with the COI framework. Drawing from the insights generated in the study, the paper proposes ways for creating more effective learning experiences in an online learning environment deficient in technology.

Keywords: Community of Inquiry, contextual challenges, online learning, low-tech online learning, Indian public schools

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L’apprentissage en ligne dans les environnements pauvres en technologie: Qu’est-ce qui fonctionne, qu’est-ce qui ne fonctionne pas ?

Résumé : La pandémie de COVID-19 a contraint de nombreuses écoles et collèges à passer brusquement à l'apprentissage en ligne pour assurer la continuité des cours pour les apprenants. Cette étude examine les facteurs contextuels qui ont soutenu ou entravé l'apprentissage en ligne pour les élèves du secondaire en Inde. Les écoles publiques incluses dans l'étude ont été sélectionnées dans 11 États. Toutes les écoles disposaient d'environnements d'apprentissage en ligne à faible technologie. Les trois présences de la Community of Inquiry (COI) (Garrison et al., 1999) ont servi de cadre théorique pour étudier comment les facteurs contextuels affectaient les pratiques en ligne et l'expérience d'enseignement des enseignants. l'apprentissage des élèves. Une étude qualitative basée sur des entretiens et des discussions de groupe a été menée auprès d'étudiants et d'enseignants. Les entretiens avec les élèves ont été menés à l'aide d'outils d'apprentissage et d'action participatifs et de discussions de groupe. Les appareils accessibles, les réseaux médiocres et le manque de compétences et de familiarité avec les technologies utilisées pour enseigner et apprendre en ligne ont été des obstacles pour les étudiants et les enseignants. Les étudiants ont eu du mal à accéder à l'apprentissage en ligne et les enseignants ont eu du mal à mettre en œuvre des pratiques d'enseignement en ligne efficaces conformes au cadre de la communauté d'enquête. Sur la base des conclusions de l'étude, l'article propose des moyens de créer des expériences d'apprentissage plus efficaces dans un environnement d'apprentissage en ligne pauvre en technologie.

Mots clés : Communauté d’enquête, défis contextuels, apprentissage en ligne, apprentissage en ligne pauvre en technologie, écoles publiques indiennes

Introduction

In 2020, the Indian government launched a new *National Education Policy*, which recommends identifying and using appropriate blended learning models for different subjects. Advocates of Information and Communications Technology (ICT) in schools consider digital technology a powerful tool for transforming teaching education. Opponents of ICT raise concerns about whether the enabling conditions for technology-supported education are in place. They are concerned about availability of ICT infrastructure and resources, teacher capabilities and training, curricular adaptations (Maniar, 2019), and whether schools have the appropriate mindset for efficiently integrating technology in education (Vijaysimha et al., 2021).

COVID-19 compelled all schools and colleges in India to quickly adopt and apply different modes of remote learning such as radio, television, mobile phones, and other online tools and platforms. Even before the pandemic began to affect classroom learning, the poor quality of government-run public education in India had been widely reported (Kingdon, 2007; Cheney et al., 2005). Many schools lack basic infrastructure such as classrooms, drinking water, toilets, and blackboards. Rural and semi-urban public schools also struggle with poor quality of teaching and learning (Cheney et al., 2005).

Thus, during online learning, the majority of public schools were largely unprepared. Students in public schools were more adversely impacted by the transition than students in private schools due to differences in their access to education technology.

Literature Review

Our review of the literature suggests that more studies have explored online learning for higher education (Garrison et al., 1999; Borsoto, 2004; Vaughan et al., 2013; Muthuprasad et al., 2021). A study of online and blended learning in the K-12 schools in 50

countries found that the key factor impacting student participation in online and blended learning was socioeconomic status (Barbour et al., 2011). Vegas et al. (2021) also observed that students in Indian public schools from households with a low socioeconomic status experienced a greater learning gap and a wider digital divide than students in private schools from households with a high socioeconomic status.

Several recent studies show the limited reach of online learning opportunities in India. Studies differ in their estimates of how many children do not have adequate access to online learning. However, as much as 60% of schoolchildren in India cannot access online learning opportunities (Azim Premji Foundation, 2020). Another study reports that almost 50% of the relatively better-off students in urban private schools had issues with Internet signal and speed, and 33% struggled with the cost of mobile data (Vyas, 2020). A more recent publication shows that only 20% of school-age children in India had access to remote education during the pandemic and only 50% participated in live online lessons (Tissera, 2021).

Theoretical Framework

This paper is based on research conducted in India during the pandemic when all schools in the country had to rapidly shift to online learning platforms to continue offering education. The objective was to examine how online learning happened in public secondary schools (Grades 8 to 12) that typically cater to the most disadvantaged sections in technologically deficient environments.

The study is significant because providing online learning on such a massive scale to secondary schools is novel in India. Diverse issues related to suddenly adopting online learning remain unexplored, particularly issues related to low-tech learning environments. With this disruption, a newer understanding of alternate ways of learning has emerged.

How can we harness this understanding to strengthen public-school education in meeting the needs of diverse students? How can the public education system develop resilience and empower itself with the capacities that come with integrating online digital technology?

This study uses the Community of Inquiry (COI) framework to understand the challenges experienced by students and teachers in online learning, to examine the necessary components of an online learning environment, and to offer recommendations for creating effective online learning experiences in a low-tech educational context.

The following questions guided the research:

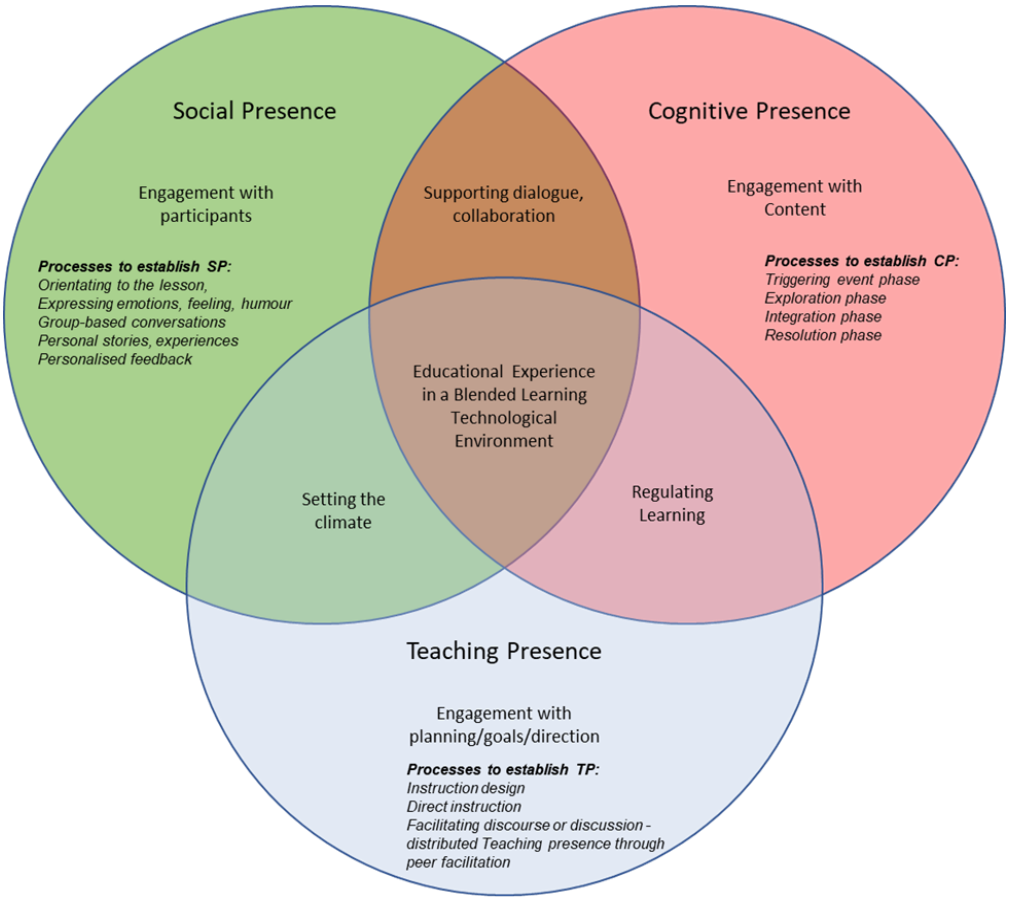
1. *What contextual challenges did public school students and teachers experience with online learning?*
2. *How did the contextual factors affect the students' experience and the teachers' practice as viewed through the three presences of the COI framework?*
3. *How did online teaching practices align with the COI framework?*

The Community of Inquiry

The COI framework by Garrison et al. (1999) served as a useful lens for investigating students' and teachers' experiences of online learning. Grounded in higher education, the proposal put forward by Garrison et al. states that an effective online educational experience is built around three components: cognitive presence, social presence, and teaching presence (see Figure 1).

Figure 1

Community of Inquiry Framework



Note. Adapted from Garrison et al. (1999). Long description of Figure 1. Community of Inquiry Framework

Cognitive presence refers to the extent to which students can build their understanding through discussions, collaborative reflections, and feedback in an online learning environment. To establish cognitive presence in an online learning environment, students must engage with content in ways that are radically different from face-to-face learning. The COI framework includes four phases of collaborative practical inquiry to create that engagement:

- A *triggering event* to identify an issue and create a sense of puzzlement
- *Exploration* to understand the issue individually and collaboratively through resources, discussion, and reflection
- *Integration* to construct meaning by connecting everybody's ideas through discussions
- *Resolution* to apply newly gained knowledge in a real setting

Social presence is the degree to which students feel affectively connected to each other. It allows students to present themselves as real people even though they are in a virtual environment. Social presence allows students to freely express ideas and thoughts in classroom discussions, thereby increasing students' satisfaction with online learning. Reflection and discussion need an environment that entails continual interaction with others. This is why social presence is essential in creating a COI.

The literature suggests diverse ways in which social presence can be established in the class such as introducing each other, providing orientations to the course and lessons, giving personalized feedback using diverse mediums such as texts and videos, facilitating affective expressions and free-flow organic conversations, sharing personal stories and experiences, and using humour and emoticons (Kreijns et al., 2014).

Teaching presence refers to the extent to which the teacher directs both cognitive and social presences to achieve personally meaningful and educationally worthwhile learning outcomes. Teaching presence consists of the following three components (Garrison et al., 1999):

- *Instruction design* starts before the actual teaching and involves making informed decisions about creating a course structure; setting learning objectives, goals, and learning outcomes; choosing content and pedagogy; planning for the flow and

assessment of online learning; and setting up the infrastructure needed to support the design.

- *Direct instruction* entails actual teaching and involves presenting content, guiding students in understanding the topic, diagnosing and addressing misconceptions, responding to students' queries and doubts, providing prompt feedback, and assessing students' learning.
- *Facilitating discourse* requires engaging students in collaborative dialogue through active discussions, designing peer communities, and moderating student participation. The teacher assumes the role of a "guide on the side" rather than a "sage on the stage," thereby allowing students to lead discussions and avoiding having the teacher dominate discussions.

Distributed Teaching Presence

The COI model uses the construct of a *teaching presence*, rather than a teacher presence. Based on this construct, the role teaching plays in creating a learning community, does not rely solely on the teacher, but instead gets distributed among students. This approach to teaching helps keep the students active, engaged, and responsible for their own learning. In an online learning environment, students also become teachers. Sanders and Lokey-Vega extend the role and responsibility of teaching in their model to include another presence termed as the *collegial presence*. They explain that collegial presence includes, "adults who work with the instructor and the students to help all members of the community of inquiry construct personal meaning and confirm mutual understanding" (Sanders & Lokey-Vega, 2020 p. 49). In the extended model put forward by Sanders and Lokey, teaching presence may include students, but collegial presence may include learning coaches, parents and guardians, co-teachers, administrators, support personnel, and counsellors.

Each presence in the COI model needs to be intentionally designed by the teacher. For students to develop higher levels of cognitive presence, teaching presence and social presence must be present in conjunction with each other. The interrelationships among the three presences are dynamic and change with each learning setting (Geng et al., 2019) and the teacher needs to balance the presences accordingly.

Perceived Affordances of Technology

Affordance theory as put forward by J. J. Gibson (1979) provided the authors of the study a lens to analyze how establishment of the three COI presences is affected by accessing and using technology. According to Gibson, *affordances* refer to what the environment provides to the individual. Affordances are the properties of an environment or object that exist irrespective of the individual's perception of them. Because these affordances exist separately, individuals can use them to take possible actions that impact the environment or object. Norman (1999) introduced the term *perceived affordances*, indicating the significance of visual cues, past experiences, and beliefs in guiding the user towards affordances or action possibilities of objects or environments.

Thompson et al. (2017) used the affordances and constraints of selected online learning tools to understand how each tool supports establishment of the COI presences. We applied the affordance theory to understand and evaluate how available technology was exploited by teachers and students for online learning.

Methodology

We adopted a qualitative research study design because the objective of our study was to understand and uncover students' and teachers' lived experiences and behaviours in an online learning environment. Qualitative data "are a source of well-grounded, rich

descriptions and explanations of processes in identifiable local contexts" (Miles & Huberman, 1994, p. 1).

Our study was also inspired by the Participatory Learning and Action (PLA) toolkit. According to Mukherjee (2002), the PLA approach to learning is based on organizing participation and interaction with local communities and groups. The underlying principle of the PLA methodology is to get students to express their experiences of online learning through active participation, rather than written surveys. This methodology is visual and embodied, which allowed researchers in this study to gather information across geographies and languages.

Location and Sample

The study spanned 11 states in India: Assam, Andhra Pradesh, Bihar, Haryana, Rajasthan, Punjab, Telangana, Karnataka, Odisha, Gujarat, and Uttarakhand. We focused on specific schools and stakeholder categories in the different states as indicated below (see also Table 1):

- In Andhra Pradesh, Gujarat, and Uttarakhand, we focused on urban blocks.
- In Haryana, Karnataka, Punjab, and Telangana, we focused on rural blocks.
- In Bihar, Odisha, Assam, and Rajasthan, we focused on tribal blocks.

Table 1

Definitions of Location Categories

Urban Blocks	Rural Blocks	Tribal Blocks
• A municipality, corporation, cantonment board, or notified town area committee • Minimum population 5,000 persons • Population density of up to 400 people per square kilometre • At least 75% of the male main working population engaged in non-agricultural pursuits	• Villages with clear surveyed boundaries, but no municipal board • Population density of up to 400 people per square kilometre • At least 75% of the male main working population engaged in non-agricultural pursuits	• Contiguous areas of settlement of tribal people of India • Groups or tribes that remained genetically homogenous, as opposed to other population groups that mixed widely within the Indian subcontinent • Although a minority, tribal blocks represent enormous diversity of groups • Groups vary in language, linguistic traits, and ecological settings

Study participants were selected from government high schools. Participants comprised 123 students in Grades 8 to 12, and 32 teachers. Specific schools and stakeholders located in urban, rural, and tribal blocks were purposively selected to provide the researchers with a broad demographic spectrum. Table 2, below, details the participants in each block.

Table 2

Distribution of Sample Across Three Area Blocks

State	Total Students	Male Students	Female Students	Teachers
Urban Blocks	40	10	30	11
Rural Blocks	37	19	18	7
Tribal Blocks	46	22	24	14

Data Collection and Analysis

PLA tools were designed and used to investigate the broad spectrum of device accessibility, students' emotional responses to online learning, students' preferred social media and internet platforms, and the daily schedules of online classes. Visual and playful means of collecting data that considered the age and attention span of students were used. The tools included a diverse set of probes: dichotomous questions, the Likert scale, a rating scale, and activity-based and participatory tools (see Appendix A for an example of a probe design).

The PLA tools were pilot-tested with a small group of government school students in an after-school learning centre in an urban block. The tools were revised as needed for appropriateness of language, images used, time required to complete the questionnaire, logic, and content validity.

A subset of students participating in the PLA were selected for semi-structured interviews and focus-group discussions. These students were selected based on their

diverse range of responses. The objective was to understand the reasons for divergent responses through more detailed interviews. Semi-structured interviews and focus-group discussions were also conducted with all the teachers. Except in the case of Odisha, the interviews were conducted by a single research assistant with considerable school experience. In Odisha, the PLA tools and interviews were conducted by a member of a non-governmental organization (NGO) who was working with the tribal community. The data collection tool kit included broad interview schedules for students and teachers. During the pilot, the authors of the paper were present to ensure the research assistant was clear about use of the data collection tools and the interview format. In most states, the interviewer was able to communicate with participants in Hindi, but they had a local assistant to help with translation if required. All interviews were recorded. Two interviews with students from Punjab were conducted online over Zoom. All other interviews were conducted face-to-face on-site.

The raw data was translated and transcribed into English. Data analysis was done in two steps. First, broad patterns were discerned through the PLA tools, analyzing device accessibility, student response to online teaching, and preferred social media and internet platforms. Second, the interview transcripts were coded and categorized to provide evidence of the three presences of the COI framework.

Findings

Study findings bring forth in three aspects. The first aspect describes key contextual challenges related to the students' participation in online classes, and the teachers' choice of learning platforms and pedagogy. The second aspect presents the students' and teachers' experiences of the three COI presences. The third aspect attempts to analyze how

the tools and platforms chosen for online learning affected establishment of the COI presences.

Key Contextual Challenges

Access to Devices

Based on data collected from the students' written responses and interviews, most students across the states accessed online classes through android smartphones. However, students in some states like Gujarat, Rajasthan, Telangana, and Haryana also had access to the non-internet-based TV programs created and broadcasted by their state Education Department.

The tribal blocks included in this study were typically located far from urban centres. These blocks had limited or no network coverage. In one block visited by our researchers, even televisions were not present in students' homes. Most students from schools in tribal blocks did not have access to smartphones; hence, they could not attend any online class (synchronous or asynchronous). Students from low-income families in urban areas also reported issues with accessing devices. Anywhere from 20% to 80% of the students across the blocks did not have adequate access to smartphones.

Very few students reported that their parents purchased a smartphone for their education. Many students shared devices with family members such as siblings, parents, or grandparents. This affected their continuous participation in the online class. Students sharing mobile phones with siblings had to leave their online class if siblings in a higher class needed to use the mobile phone. For example, a student from a tribal block said, "My grandfather had a mobile and needed it so I couldn't attend online classes. There is a mobile in my home, but my [older] sister is there, and she used it more. There wasn't time for me."

The non-availability of smartphones or laptops added challenges for the teachers in diverse ways such as when choosing online learning and teaching platforms, deciding whether to use synchronous or asynchronous learning, connecting with students, sending assignments and notices, and giving students feedback. Most teachers across the states iterated that they used WhatsApp extensively to connect with students and send assignments. In Assam, Bihar, and Uttarakhand, teachers even used WhatsApp to hold asynchronous classes. For example, a teacher from an urban block said:

> *In online classes like, we have to deal with the limitations of students also. It is a government school and all students come from different strata economically. The availability of mobile phones in the initial stage was very difficult. We had to send them videos through WhatsApp (an asynchronous platform) instead of directly talking to them at one time through Google Meet (a synchronous platform) because some of the students have three or four other siblings with them who also need the phone. They couldn't use a single phone for all the siblings at the same time for all of them. They might be having different classes at the same time, the other siblings also.*

Access to Network

Internet connectivity also emerged as a crucial determining factor that influenced both teachers' instructions and students' participation in online learning. Slow and poor network connections posed severe challenges for students, especially in semi-urban, rural, and tribal areas. In one tribal school, none of the children could learn online because they had no connectivity to get lessons, not even on WhatsApp. Most schools in tribal blocks, and a few in rural and urban blocks, held asynchronous sessions throughout lockdown.

Limited network availability created barriers for teachers in translating their pedagogy into fruitful student learning experiences; thereby, inhibiting the establishment of teaching presence. For example, a teacher from the tribal block stated how network issues disrupted the classroom experience, "At certain times there was a network problem… so we needed to stop the classes at that time."

Poor network connections caused poor interpersonal connection between students and teachers. Some students failed to revert to teachers for clarification because of poor network connections. For example, a student from the urban block said, "We got confused about what teachers were saying because of the network issues and we are not able to ask that thing to teachers like [as] we ask in offline classes." Given that teachers could not receive any homework from students, they also could not send students feedback.

Even the teachers' ability to plan for cognitive presence by selecting and curating appropriate content for online learning was affected by poor network connections. Due to limited data, students could not stream live sessions, nor could they download recorded classroom sessions or video-based course content. For example, a teacher from an urban school explained that most teachers in their school chunked textbook chapters into smaller sections and shared a PDF or images of the chapters with their students. This allowed students to download short content with limited data and network availability. As the teacher reported, "We take a page or one-and-a-half pages, and send it, and students had to work on that."

Students, on the other hand, reported that this chunking of chapters by the teachers led to the content being jumbled up and fragmented. Students found it difficult to stitch the content together to create a coherent picture of the topic. A student from an urban school stated:

> *And during studying online, when teachers used to send something for us to write and I did not understand it, we wrote whatever was sent for us to write. So, I could not understand what it was, part of what, part of which chapter. [I] was not able to understand anything."*

Technological Competency and Familiarity

With no experience in online teaching, and inadequate support and infrastructure, teachers from all states reported an initial sense of anxiety, challenges, and fear of using online learning technology.

More teachers than students reported their challenges with using the online teaching platform. Teachers were expected to understand the technology first and then exploit it adequately to create and deliver effective lessons. The rapid transition to full online teaching demanded that teachers radically shift their teaching practice to make it amenable to online learning. However, being unfamiliar with the online digital learning ecosystem, including its theoretical and practical assumptions, posed serious difficulties for teachers. An experienced teacher from an urban school said:

> *As far as these gadgets are concerned, we are just novices in that because we are not introduced for a long time. As far as the discussion on post-pandemic online classes goes, we had no experience with that, it was a new thing for us in our life… Trying took us nearly three months to understand how children can be taught, and approximately five to six months were taken up in just setting up… The first challenge is for ourselves to understand what it is. We had heard of online classes and virtual classes, but had no idea what it was.… there was no training—only through WhatsApp and Facebook. Messages were propagated that you should do this, should do that. But if someone has spent 50 years of their life without a phone, and is suddenly told to teach online, can you imagine what would have been his state?*

Limited or no experience with learning technology posed difficulties for teachers in navigating the online platforms. This prevented them from exploiting the affordances of the platforms and designing effective learning experiences for students. Teachers needed to be able to use Learning Management Systems (LMS) such as Microsoft Teams or Google Meet. However, their limited understanding of the possible uses of these systems, and their competency in using them, affected the adequate representation of the COI

framework. Teachers were not adequately familiar with how each of the systems could be used for an effective online classroom experience.

States such as Haryana, Gujarat, Rajasthan, Punjab, and Karnataka supported their teachers through continuous training and development. For example, a teacher from the tribal block shared:

> *Yes, yes definitely (we had training). Our principal you know started this thing (training), and our in-charge started this thing. They made certain things very informative; they told us to attend training, CBSE training. We had around four to five sessions even before the online class started… Training is always required. Because if there are certain innovations, if there are certain updates, we need to know those updates, [since] there are certain software or certain applications that are difficult to adopt.*

As suggested by the participant comment above, most training provided to teachers was limited to familiarizing them with the applications. The training was provided to help them learn basic functions of the applications such as accessing and curating content, uploading assignments, and organizing classes on WhatsApp. How these applications could be used to facilitate learning in an online environment was not discussed during the training.

Students who accessed synchronous online classes through Microsoft Teams or Google Meet perceived an initial challenge in navigating the online learning platforms. Some students reported being greatly overwhelmed by the complex functions of the platforms; others faced only initial challenges. Students from states that received adequate support from their teachers over time became more familiar with the functions of the LMS. This reduced their fear and anxiety related to learning online. For example, a student from an urban school reported:

> *For me, Mrs. K., our math teacher, helped when I was going to school for internet [access]. I did online classes in school. Teachers used to come once in a while. Mrs. K. told me about*

Google and all other stuff. Before that, I was really new to those, and didn't even know how to upload my work.

The findings imply that training teachers to become familiar with online learning platforms and their functions is the first step towards creating an effective online teaching and learning environment. However, simply becoming familiar with the platforms is not adequate. Teachers need training in how to explore and exploit what these platforms can do to create effective and diverse learning experiences in an online environment.

Cognitive Presence

Teachers' Perspective

Teachers may not have been aware of the COI model and its components and processes, but they were assumed to have practical experiences with using some of these processes in their classes.

The findings indicate that most teachers were working towards enhancing content curation and content delivery to students. To continue uninterrupted learning, the central and the state governments in India developed free mobile teaching applications for teachers. These applications included course-specific content in diverse modes such as text-based, audio-video materials, worksheets, quizzes, and assignments to facilitate online learning. How effective these applications were in supporting teaching and learning needs further investigation. Teachers reported having used these ready-made worksheets and quizzes to enhance student-content interaction. For example, a teacher from a well-supported rural block said, "We used to get ready-made learning material, or teaching material from our department that we used to send to our students, and there were regular quizzes on different subjects… It went regularly throughout the year."

During interviews, most teachers reported using YouTube videos to support content development or make concepts more accessible for students. Keeping the curricular objective in mind, teachers in states such as Haryana and Rajasthan, also took measures to enhance the quality and nature of digital learning resources by creating resources and tailoring them to the specific needs of their students. Students could access videos at a time when they had adequate network availability. For example, a teacher from Rajasthan said:

> *Lot of efforts and thinking process is going on, and finally after 15 days or 14 days of time, we reached to the conclusion that we will prepare our own videos and prepare our own PowerPoint presentations, and you know show our spoken skills by having our content at the site and speak regularly so that there should be a drill practice for the students, and students will learn those words that we speak more often. You know, certain topics we have to concentrate, and certain topics we have to give to the students. If they face problems, they will ask the questions.*

Although teachers seemed to be sensitive to the challenges of learning online and the need to engage students differently, their sensitivities seemed limited to the nature of the content, not to how students engage with the content. There seemed to be an underlying assumption that audio-video content by its nature would enhance students' learning. For example, the Assistant Block Resource Coordinator of a rural school said:

> *Children could study even when staying at home. All school teachers were instructed to make WhatsApp groups of their own classes and all the children should be there. All children joined WhatsApp groups, and teachers could send work daily through it, and inform students through phone about TV channels Edu-sat programs. Children saw a video, then they understood, and teachers provided worksheets.*

Access to device and network availability did constrain teachers' decisions related to creating effective online learning experiences. However, other crucial elements of cognitive presence were missing from the teachers' accounts of content engagement, such as inquiry-based work, active discussions, critical reflection, and instant feedback.

Students' Perspective

Interviews with students suggested that most students across the sample associated online learning with negative emotions and this was largely due to issues with understanding content. Teachers provided text-based and video-based resources, or delivered content through live sessions to students. Despite that, students appeared to face considerable challenges in comprehending the materials sent by their teachers. In many cases, students ended up simply copying down the textual material sent using WhatsApp or uploaded on a LMS. A student from an urban block said:

> *I got confused because whenever the teacher taught, I understood. But then when the teacher taught [online], I thought what has she taught, [I] did not understand and when the teacher asked what did you understand, then I did not even know what I understood.*

Another student from an urban block said, "I was angry because I did not know what was taught." A student from a rural block said, "In online classes, something would be missed and we could not understand well so that led to confusion."

Also, many content-related videos and resources sent to students were in English, which posed a challenge for students whose language of instruction was not English.

Like traditional face-to-face learning, online learning requires active and engaging activities. Cognitive presence in online classrooms demands a radically different learning approach that involves critical, creative, and reflective thinking; is relevant to students; and can be applied to real-world situations. Examples include inquiry-driven and problem-based learning. Findings on the students' perspective suggest that they mostly repeated on online platforms the same lecture-based instructions they would have used in a classroom, albeit using presentations and videos. The teachers' lack of knowledge, capabilities, and experience in creating meaningful online learning experiences through suitable pedagogical approaches affected students' learning experience to a large extent.

So did teachers' lack of experience in curating and creating appropriate digital content that aligns with curricular objectives.

Teaching Presence

Teachers' Perspective

In a face-to-face classroom, a teacher is physically present. In an online class, a teacher must intentionally establish their presence. Understanding the role and manifestation of teaching presence in an online learning environment is crucial to sustaining a motivated online learning community. Teaching presence begins before the course starts as the teacher plans the course. It continues during the course as the teacher facilitates discourse and direct instruction (Anderson et al., 2001).

The design and organization of an online course are more complex than with a face-to-face course (Borsoto, 2004). The complexity comes from including technology. The teacher has to not only plan course delivery, but also consider the medium through which the course is delivered, which is technology.

Due to minimal training in online instruction, challenges with network availability, the difficulty students had with accessing technology, and a lack of adequate online curriculum-based support, most teachers in this study were occupied with either using technology to access and curate content, or creating personalized content. Thus, design and organization for online learning were limited to translating face-to-face curricular content into digital form.

Initial planning went into organizing the online class. Subject-specific and grade-specific WhatsApp groups were created so teachers could send learning materials to students. Because most students were sharing phones with family members, teachers had to get phone numbers from students and form the students into groups. Some teachers in

Uttarakhand who had large class sizes formed several student groups to interact with on alternate days. For example, a teacher from an urban area said, "Different groups were formed. Suppose I had 60 students, then I had divided them into groups of 20 according to their category, 20 children today, 20 tomorrow like that."

In this study, teachers across the sample reported predominantly using the *direct instruction component* of teaching presence. There was little evidence from interviews to indicate teachers used other components of the teaching presence such as *facilitating discourse* and *instruction design*. To explain and deliver content, most teachers created PowerPoint presentations, or curated web-based video content. Many teachers reported addressing students' concerns and doubts while delivering instructions on synchronous platforms.

For students accessing asynchronous learning through WhatsApp, teaching presence, especially direct instruction, was severely compromised. As mentioned above, images of pages from the textbook or content-related videos were sent to students. The students were then expected to construct their own meaning from the images and videos and send teachers a text through the platform if they needed clarifications. Very few teachers reported receiving clarification queries from students or contacting individual students to explain content.

As mentioned earlier, assessing students' learning is a critical element of teaching presence. Although teachers reported having made considerable effort to provide instruction, a similar level of effort was not reported for assessing students' learning in online classes. When assessments happened, teachers used the traditional format such as textbooks-based written tests. Teachers who had educational applications had the opportunity to give students online assessments such as online quizzes and worksheets.

They could do this using the strategies and formats embedded in the applications. However, teachers distrusted this form of assessment due to unfair practices evident in students' responses such as cheating and copying. A teacher from an urban school reported:

> *Children didn't like to study online. Half the children studied and half did not. In the exams also, they used to write to each other or copy and write. So, we could not understand from the marks who was a good student and who wasn't. We could not assess.*

Teachers' interviews indicate that only a few teachers from Haryana and Rajasthan engaged in whole-class discussions and none of the teachers reported facilitating group discussions. In a few cases, teachers got students to organize and facilitate quizzes for their class peers. Other than this, none of the teachers reported having adopted any distributed teaching strategies through peer facilitation to enhance students' learning. Teachers mostly dominated the online learning space. Ironically, students had a different perspective on the teaching presence.

Students' Perspective

On an asynchronous platform such as WhatsApp, the lack of teaching presence was more pronounced than on a synchronous live platform. Most students who received learning materials on WhatsApp could not revert to teachers for clarifications. Students also could not receive feedback on the work they submitted.

Even in live synchronous online classes, students perceived a lack of teaching presence, mostly due to the lack of personalized feedback and prompt response from teachers. They also perceived a lack of active and focused discussions among their peers, and between students and teachers. A glimpse into a conversation with a student from an urban school suggests the perception of lack of teaching presence:

Interviewer: When you said it was a mess. What was the mess like? Was it the mess at the level of how the content was being delivered, or how you were not able to understand, or a combination of both?

Student: Like if we need extra help from the teachers, it [help] would not be there. Like in school you can go any time, ask them any doubt, how long you want, but not in online class.

In terms of assessment, students mostly perceived online assessment at the end of the academic year to be stress-free in comparison to offline assessment. As mentioned earlier, online assessments followed traditional formats and were not adapted to the online learning environment. The lack of vigilance with online assessments as compared to the face-to-face format, and the traditional assessment format based on rote memorization led many students to cheat by using textbooks or receiving help from their parents or family members while taking online examinations.

Distributed Teaching Presence

Within the context of this study, which is marked by technological deprivation and inaccessibility of online learning by students, an extended process of distributed teaching presence was apparent. As evident from the data emerging from this study, we propose to extend the role of teaching within teaching presence to be not only distributed between students and teachers, but extended to individuals beyond the formal academic space such as parents, communities, and coaching teachers. Individuals outside of the formal academic space can help learners construct personal meaning and understanding. This is consistent with Sanders and Lokey-Vega (2020) mentioned in the literature review. Sanders and Lokey Vega introduced a fourth component, called the collegial presence, to incorporate individuals from formal and non-formal learning spaces who help the community of inquirers build mutual understanding and personal meaning.

In this study, governments in a few states developed a community-based inclusive strategy, such as in the Shiksha Mitra smartphone application used in one state, that provided students who could not afford smartphones physical access to smartphones so they could engage in online learning. The strategy was to involve a small group of students with a member of their community such as a neighbour, parent, or private coaching teacher who had access to a smartphone and could become a connecting point for students. For example, a teacher reported:

> *Parents already had mobiles, but some parents did not have. They said they would buy, and teachers also said they would help. And we also made Shiksha Mitra (SM) (on the mobile App Avsar); five children could join this. Teachers also could be SM; otherwise, some neighbour or relative could also become SM. Their mobiles were used for children so that children's studies wouldn't be affected and that they could continue studying. For this, SM was quite beneficial. Parents also helped quite a bit.*

While the support seemed technological, students' interviews across many states indicate that they received immense learning support from parents, siblings, and private coaching (or tuition teachers). Self-reports from teachers and parents indicate that parents played a pivotal role in supporting their children's online education. Parents also communicated with teachers to seek support and guidance on explaining tasks, and using online learning platforms. With intermittent classes, private tuitions established the teaching presence. These private tuitions served as the best support for students as they were learning by covering missed portions of the online class, clarifying doubts, and even preparing students for their public or board examinations. Thus, the community-based support strategy has great potential for establishing a teaching presence in a low-tech online environment.

Social Presence

Teachers' Perspective

Learning is a social process. Lack of communication between peers and teachers in an online environment enhances the psychological distance between them. Narrowing this psychological distance is imperative in increasing student engagement and satisfaction.

None of the teachers reported having designed, assigned, or organized any collaborative or peer engagement in either synchronous or asynchronous learning classes. Synchronous learning platforms, such as Zoom or Google Classroom, were used by teachers for live instructions. WhatsApp was used extensively for asynchronous instructions. However, none of these platforms was exploited to promote group discussions, or any collaborative engagements such as break-out sessions or home-based asynchronous collaborative activities.

Teachers seemed to be aware of the value of social presence and its lack in the online environment. However, this understanding was not used to create a community of learners held together through interpersonal bonding. A teacher from a rural school stated:

> *But this thing really affected the students, I tell you. Like not meeting their friends, like in old age also, you say that the physical touch gives so much relief to you. If you are going under depression or some very sad thing, if you get a physical touch that gives you motivation, you get better. So, these things had been missing in the last year so it affects the students in other matters also and in studies also. Because they didn't get to play together, they didn't get to play mischief together, so all these things are necessary while growing up.*

However, findings from this study uncovered unique ways in which most teachers supported social presence beyond the online learning space. In a resource-deficient, low-tech educational environment, many teachers were found to assume the role of pastoral

caregivers ensuring the well-being of students beyond the online class. The non-online background support that teachers provided to individual students ranged from giving financial support to underprivileged students, to procuring smartphones to continue online classes, conducting administrative tasks such as e-monitoring and recording online student visits, and reaching out to individual parents to motivate them to get their children to attend online classes.

For example, a teacher from a rural block stated, "Some children didn't have mobiles and teachers. If they had extra mobiles lying around, they gave it to students and they could continue. Something is better than nothing."

Another teacher from the tribal block said, "If any boy or girl doesn't have a notebook or pencil, then I give them money for them to go and get it from the shop. I feel proud to help others."

One of the supervisors from a rural block said, "Teachers also have put in a lot of effort. They had to call daily, and we even had to call 20 parents and send the record."

Most students in the rural and tribal areas reported assisting their parents in household chores or at their place of work such as a farm. This demanded that teachers schedule classes that match students' availability. Some teachers from Telangana even reported that they held evening classes for students.

Students' Perspective

Students' interviews suggested that social presence was highly compromised in the online learning environment. This was true for both synchronous and asynchronous settings. However, in asynchronous settings, students were severely cut off from their peers and teachers. All students suggested they missed interacting with peers and teachers. The lack of social interaction led to students associating online learning

experiences more frequently with negative emotions such as boredom, confusion, anger, and being left out. For instance, a student who attended synchronous class in a rural block said, “We felt bored because we could not interact with our teachers and our classmates.”

Alawamleh et al. (2020) cited several studies that indicate early adopters of online learning face tremendous challenges of engagement and interactivity. This is due to the lack of immediacy and non-verbal cues that are present in face-to-face classes. Due to limited data and network availability, most students in this study reported having switched off their cameras, which affected their social presence considerably.

In an online classroom with access to devices, some students reported experiencing a sense of autonomy, or a sense of having the power to fake their presence before teachers and peers by switching off their cameras and playing games or watching videos on other tabs, or not being present at all.

Conclusion

The present study corroborates reports (Azim Premji Foundation, 2020; Vyas, 2020; Tissera, 2021) of the limited access to online learning experienced by the majority of India’s school-going children. Device accessibility and poor network connections were key contextual factors that not only inhibited students from accessing online learning, but created barriers for teachers in translating their pedagogy into fruitful learning experiences for students. Due to limited internet connectivity, students sometimes failed to revert to teachers for clarification. Contextual challenges led many students to develop negative emotional associations with online learning.

The COI framework provided us with a useful heuristic to analyze the effectiveness of online learning. The framework also helped us arrive at a nuanced understanding of the

limited effectiveness of online learning, and go beyond issues of access to device and data networks.

Apart from factors such as inaccessibility to devices and good network connections, students' negative associations with online learning were also due to a lack of effective design and integration of the essential components of the COI framework: cognitive presence, teaching presence, and social presence.

For establishing a cognitive presence online, teachers mostly repeated on online platforms the same lecture-based instructions they used in the classroom, albeit using presentations and videos. In the majority of cases, students were not able to learn effectively this way. Many students developed negative associations with online learning due to the perceived lack of teaching presence to help them understand content.

A crucial insight developed in the study was identifying distributed teaching presence in a low-tech online learning ecosystem through diverse stakeholders. Distributed teaching presence could be an opportunity to invite and involve the community in online education by providing affordances such as devices to disadvantaged students. In addition, tuition teachers and parents could be supported through partnerships between schools, NGOs, and community volunteers to identify and bridge the learning gap of students.

Social presence during online learning, which is crucial for students' motivation for learning, was clearly missing in all the states according to student narratives. Given that they were often not aware of the COI framework, teachers did not build this into their online pedagogy.

Thus, the data from this study clearly shows the need for teachers to actively build cognitive presence, teaching presence, and social presence to improve student outcomes in

online learning situations. To be able to do this, they need training in the components and subcomponents of the COI model, which is imperative for an effective online or blended learning environment. As reported by the participating teachers, most training at present focuses on technological tools and these are obviously needed by teachers. However, by not paying attention to the processes involved in creating an effective learning experience for students participating in online classes, massive learning gaps are created, especially among economically and socially disadvantaged students.

India's new *National Education Policy* places strong emphasis on online education (Baral, 2020). The policy aims to make online learning and virtual classrooms accessible to every student. However, ground realities show this vision is far into the future. If students and teachers in present-day India are to benefit from technology, a clear-sighted approach needs to be taken. Such an approach must be based on a sound educational foundation, such as the one provided by the COI framework. The educational foundation must also consider the challenges of a relatively low-tech environment and lack of teacher preparation for delivering online education.

Long description of Figure 1. Community of Inquiry Framework

A Venn diagram demonstrates where Social, Teaching and Cognitive Presence intersects as follows:

Social Presence is an engagement with participants, and includes the following processes:

- Orientating to the lesson
- Expressing emotions, feeling, humour
- Group-based conversations
- Personal stories, experiences
- Personalized feedback

Cognitive Presence is an engagement with the content and includes the following phases:

- Triggering event phase
- Exploration phase
- Integration phase
- Resolution phase

Teaching Presence is an engagement with planning, goals and direction and includes:

- Instruction design
- Direct instruction
- Facilitating discourse or discussion - distributed teaching process through peer facilitation

Having a Social Presence and Cognitive Presence supports dialogue and collaboration.
Having a Social Presence and Teaching Presence supports the process of setting the climate.
Having a Cognitive Presence and Teaching Presence supports the process of regulating learning.
Social Presence, Cognitive Presence, and Teaching Presence intersects to create an educational experience in a Blended Learning technological Environment.
[Back to Figure 1]

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References

Alawamleh, M., Al-Twait, L. M., & Al-Saht, G. R. (2020, August 24). The effect of online learning on communication between instructor and students during Covid-19 pandemic. *Asian Education and Development Studies, 11*(2), 380–400. https://doi.org/10.1108/AEDS-06-2020-0131

Anderson, T., Rourke, L., Garrison, R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, *5*(2). https:/doi.org/10.24059/olj.v5i2.1875

Azim Premji Foundation. (2020, September). *Myths of online education: Field studies in education*. Azim Premji University. https://azimpremjiuniversity.edu.in/field-studies-in-education/myths-of-online-education

Baral, M. (Ed.). (2020, July 30). *New education policy moots formation of National Education Technology Forum*. NDTV Education. Retrieved on July 31, 2020, from https://www.ndtv.com/education/new-education-policy-moots-formation-of-technology-forum

Barbour, M. K., Brown, R., Waters, L. H., Hoey, R., Hunt, J. L., Kennedy, K., Ounsworth, C., Powell, A., & Trimm, T. (2011). *Online and blended learning: A survey of policy and practice from K-12 schools around the world*. International Association for K-12 Online Learning. https://files.eric.ed.gov/fulltext/ED537334.pdf

Borsoto, C. B. (2004). Community of inquiry a precondition of higher learning in online journalism courses. *Asia Pacific Media Educator, 15*, Article 10, 131–148. https://ro.uow.edu.au/apme/vol1/iss15/10

Cheney, G. R., Ruzzi, B. B., & Muralidharan, K. (2005, November). *A profile of the Indian education system.* New Commission on the Skills of the American Workforce, National Center on Education and the Economy. https://www.academia.edu/2967274/A_profile_of_the_Indian_education_system

Garrison, D. R., Anderson, T., & Archer, W. (1999, March). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2–3), 87–105. https://doi.org/10.1016/S1096-7516(00)00016-6

Geng, S., Law, K. M. Y., & Niu, B. (2019, May 21). Investigating self-directed learning and technology readiness in blending learning environment. *International Journal of Educational Technology in Higher Education*, *16*(17). https://doi.org/10.1186/s41239-019-0147-0

Gibson, J. J. (1979). *The ecological approach to visual perception*. Houghton Mifflin.

Kingdon, G. G. (2007, January 1). The progress of school education in India. *Oxford Review of Economic Policy, 23*(2), 168–195. https://doi.org/10.1093/oxrep/grm015

Kreijns, K., Van Acker, F., Vermeulen, M., & Van Buuren, H. (2014, January 1). Community of Inquiry: social presence revisited. *E-Learning and Digital Media, 11*(1), 5–18. https://doi.org/10.2304/elea.2014.11

Maniar, V. (2019). ICT in Schools: Panacea or pipe dream? In D. Lakshminarayan (Ed.), *Technology in education: The gap between policy and praxis.* Centre for Communication and Development Studies.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Sage Publications.

Mukherjee, N. (2002). *Participatory learning and action: With 100 field methods.* Concept Publishing Company.

Muthuprasad, T., Aiswarya, S., Aditya, K. S., & Girish, K. J. (2021). Students' perception and preference for online education in India during COVID-19 pandemic. *Social Sciences and Humanities Open*, *3*(1). https://doi.org/10.1016/j.ssaho.2020.100101

Norman, D. (1999, June). Affordance, conventions, and design. *Interactions, 6*(3). 38–43. https://doi.org/10.1145/301153.301168

Sanders, K., & Lokey-Vega, A. (2020, May 1). K-12 Community of Inquiry: A case study of the applicability of the Community of Inquiry framework in the K-12 learning environment. *Journal of Online Learning Research, 6*(1), 35–56. https://files.eric.ed.gov/fulltext/EJ1254070.pdf

Thompson, P., Vogler, J. S., & Xiu, Y. (2017). Strategic tooling: Technology for constructing a Community of Inquiry. *Journal of Educators Online, 14*(2). https://files.eric.ed.gov/fulltext/EJ1150675.pdf

Tissera, M. (2021, November 12). *Eighty percent of children left without access to education during school closures* [Press release]. LIRNEasia. Retrieved on January 4, 2023, from https://lirneasia.net/2021/11/80-of-children-left-without-access-to-education-during-school-closures-press-release

Vaughan, N. D., Cleveland-Innes, M., & Garrison, R. (2013). *Teaching in blended learning environments: Creating and sustaining Communities of Inquiry*. AU Press.

https://www.aupress.ca/app/uploads/120229_99Z_Vaughan_et_al_2013-Teaching_in_Blended_Learning_Environments.pdf

Vegas, E., Shah, S., & Fowler, B. (2021*). Ed tech and educational opportunity during the COVID-19 school closures: A case study of Chennai, Tamil Nadu*. Brookings Institution. https://files.eric.ed.gov/fulltext/ED617259.pdf

Vijaysimha, I., Sundararaman, I., Aravamuthu, K., & Biju, A. M. (2021). *Building STEM mindsets: An ecosystem approach*. Quest Alliance. https://www.questalliance.net/our-publications

Vyas, A. (2020). *Status report: Government and private schools during COVID-19*. Oxfam India. https://www.oxfamindia.org/sites/default/files/2020-09/Status%20report%20Government%20and%20private%20schools%20during%20COVID%20-%2019.pdf

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Appendix A

An Example of a PLA Probe (Researcher's Version)

Probe 1: Did you have online learning classes during the lockdown?

Logistics, Time: 10 minutes including the instructions

Materials: A large sheet of paper, marker pens, and black and red coloured *bindi* (a decorative dot worn in the middle of the forehead by Indian women)

Facilitator: One facilitator

Participants: All the participants can respond on the same sheet of paper.

Preparation for the Activity (Facilitator can choose any one of these options, based on the setting and mood)*:*

a. Option 1: The facilitator writes down the prompt on the top of the sheet and draws two big, equally sized circles side-by-side.

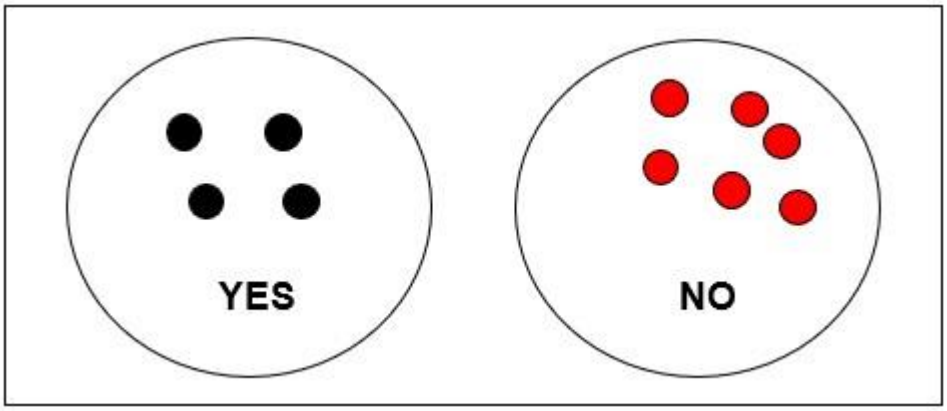
b. Option 2: The facilitator draws two big circles on the floor with chalk. Inside one circle, the facilitator writes "YES," and inside the other, they write "NO."

Directions *(*Facilitator can choose any one of these options, based on the setting and the mood):

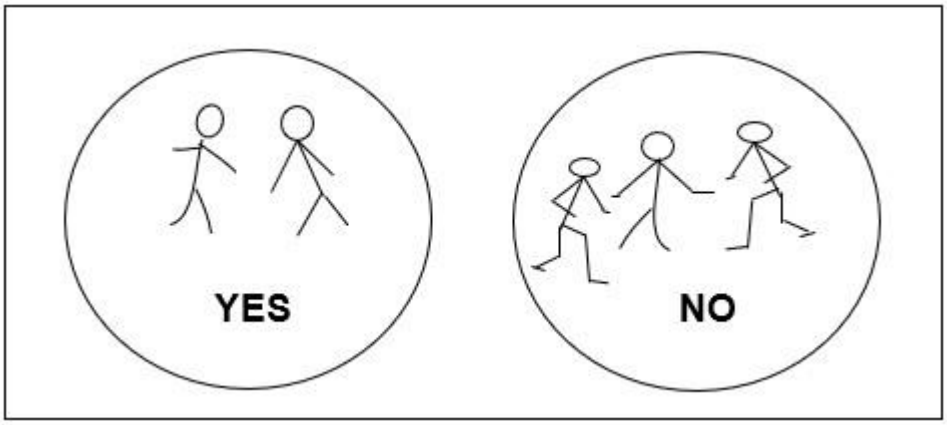
a. Option 1: Students stick a black *bindi* in the circle with "Yes" and a red *bindi* in the circle with "No."

b. Option 2: The facilitator claps and the children move around the two circles. When clapping stops, they listen to the probe, and step into the two circles accordingly.

Option 1:



Option 2:



Follow-Up Interview Questions (Semi-Structured):

- You mentioned that you did not attend online classes during the lockdown. Why were you not able to attend the classes?
- If your school was shut down, did you learn anything during this time? How did you learn?

[Back to Data Collection & Analysis]