Impact of the COVID-19 pandemic on Physics teaching in India

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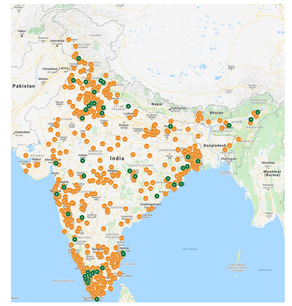
Locations of panelists of DFOT

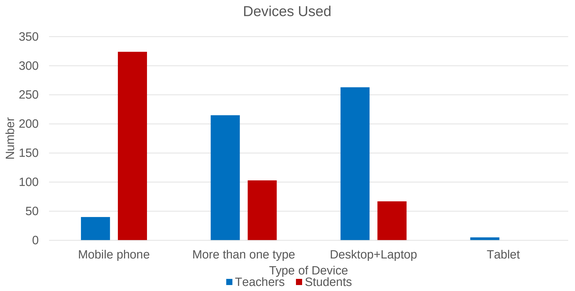
Background: Covid-19 pandemic and subsequent closure of academic institutions have compelled the transition of formal education in India to online. Given the significant digital divide between rural and urban India, and the uneven access to digital infrastructure, the impact of this transition has been uneven. Even more critical is the issue of differential access to resources (that depends upon a number of socioeconomic factors, including gender) and can lead to serious consequences such as early dropouts, career breaks etc. In this critical time of pandemic, institutional support to the academic community has been inadequate, with long-term effects on the teaching of physics and other subjects requiring laboratory instruction. Educational institutions provide safe and enabling learning spaces, especially for women students. Away from campuses, women students and teachers are often burdened with increased domestic responsibilities, and can have reduced access to scarce resources such as devices and/or data. At this juncture, understanding as well as mitigating challenges of such uneven transition to online teaching is paramount; and is achieved through initiatives such as:

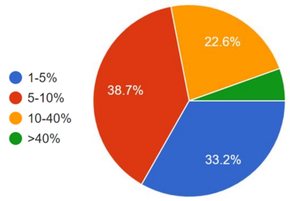
- ❑ *Discussion Forum for Online Teaching* (DFOT) set up to address the need of teachers to find appropriate resources and to seek solutions.
- ❑ National initiatives "*Vigyan Pratibha*" and "*Vigyan Vidushi*" to reach out to larger teaching- learning communities from school to MSc levels online.



Geographic profiles:
VV 2021 (physics) participants

Discussion Forum for Online Teaching





Percentage of students getting disconnected during a class

DFOT [1] was initiated in mid-2020 to address the uneven transition to online teaching in India. DFOT's purpose was to help teachers to adapt to the new mode through sharing resources, discussions, and training sessions. Given the diversity in India - geographical, social, regional and economic - panelists and experts were selected from across the country. Responses to DFOT suggest that;

- Although a large number of students log-in to online classes, nearly 40% get disconnected in between due to lack of proper internet signals.
- Most teachers use laptops for teaching, most students attending classes on (shared) mobile smartphones.
- When mobile phones are shared in a household, girls are at a disadvantage (in terms of access).
- Household work was another area where women shouldered a larger burden than men.
- The anonymity provided by online classes have allowed shy students, usually female, to interact more.
- Conduct of laboratory courses continues to be a problem in Physics curricula. Initiatives such as virtual labs, sending low-cost equipment to the students' homes, virtual-labs, providing students the experimental data to analyse have been taken up by the physics teachers.

References:

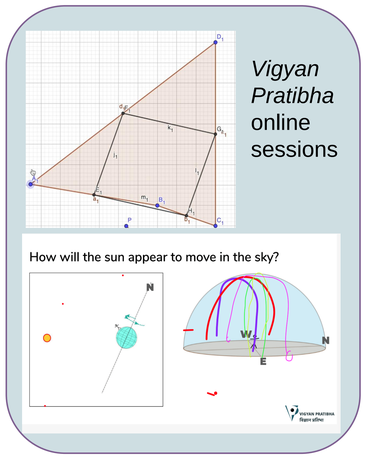
1. https://sites.google.com/view/dfot2020/home
2. Physics News, Vol. 50 No. 4 pp 46-47 https://www.tifr.res.in/~ipa1970/news/2020/OctDec/Oct_Dec_2020_final.pdf
3. https://vigyanpratibha.in * Vigyan Pratibha program is funded by Govt. of India, Department of Atomic Energy (R&D- TFR-0650)

Vigyan Pratibha

HBCSE VIGYAN PRATIBHA विज्ञान प्रतिभा

"*Vigyan Pratibha*" student nurture program is aimed at enhancing class 8th, 9th and 10th students' scientific and mathematical proficiencies, through teacher capacity building [3]. Since March 2020, the *Vigyan Pratibha online* discussion sessions are engaging nationwide school teachers in pedagogic discussions of science and mathematics content.

- ❑ 62 online pedagogic discussion sessions
- ❑ ~ 228 teachers attended sessions,
- ❑ 101 certificates awarded to contributing teachers



Vigyan Pratibha online sessions

Vigyan Vidushi

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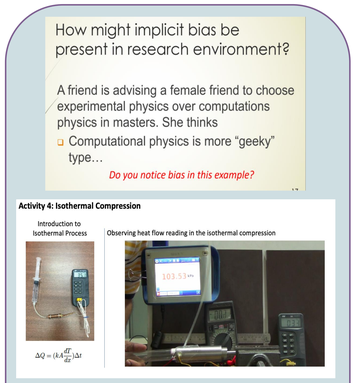

Vigyan Vidushi online sessions

"*Vigyan Vidushi*" (VV) is a summer school organized for females pursuing MSc (I) physics to offer them a) exposure to advanced physics areas; b) timely career guidance by female physicists; c) exposure to successful women scientists as role models.

- ❑ *VV* 2020 is first online summer school in India, 2 schools organized in 2020 & 2021, ~ 50 students in each school.
- ❑ Interactions with pan-India physicists during specialized career discussion sessions.
- ❑ ~ 1000 students were offered remote participation access to the lectures on advanced physics topics
- ❑ Special lectures by eminent scientists, including "Bibha Chowdhuri" Memorial Lecture.
- ❑ Spawned programs in computer science and maths.