Centre for
The Digital Future

White Paper

Technology and Education

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Introduction

Over the last year, COVID19 has caused huge disruptions in the education of millions of students. Since March, a large chunk of the Indian school system has migrated to online modes of instruction with varying degrees of success. Challenges with this are obvious. First is the low ownership of computers or smartphones in households in India. Second pertains to problems with internet connectivity and challenges with power availability in large parts of the country. Third is the ability of our teachers to teach online. Problems of access to technology and internet also apply to teachers.

At the same time, it is important to note that the role of technology in education is not limited to just the use of communication technology in education, or 'online education' as is the case during the COVID pandemic. Education technologies include hardware and software innovations that reduce the cost of communication between the various pillars of the education system – schools, teachers, students and parents; can decentralize the provision of education; provide feedback and customized learning based on data analysis etc. This paper is an attempt to think and reflect upon how to use technology as an aid in the Indian education ecosystem to achieve the objective of quality education for all.

The Centre for The Digital Future at the India Development Foundation, in collaboration with other researchers and institutions, aims to explore the use of real-time and other novel datasets to address the research questions raised by the experts. This project is supported by the Facebook's Data for Good initiative. This paper is based on a panel discussion organised as a part of this project.

Summary of discussion

"Building a system that responds to research, and knowledge that is an outcome of such research"

One of the most important points highlighted by all the panelists was that a commitment from researchers to communicate the knowledge generated as part of the research effort to all pillars of the ecosystem that would lead towards progressive development. It is essential to demystify data and make information accessible in understandable forms to all stakeholders of the system. This would prompt active engagement by all pillars of the system to improve it holistically. Education is a collective problem, and thus data and

information generated from research should feedback into policies, classrooms, and homes.

The four pillars of education ecosystem are students, teachers, institutions, and parents. The credibility of the traditional teaching-learning process in school spaces and the organic relationship between teachers and students needs to be acknowledged, especially in the use of technology in education. Technology in the education system should complement by strengthening the face-to-face, group, and social processes that constitute education rather than play a role of a standalone substitute. It is essential to embed technology in a harmonious manner along with the traditional ways of physical classrooms to realise the idea of blended learning. Technology can help realise a wider reach of knowledge across regions and communities within a region by leveraging appropriate digital platforms like print, broadcast, telecast, telecom services, and internet streaming.

However, as one of the panelists pointed out: technological interventions in education currently take the form of "reinventing the wheel", but where the focus should be on is creating new modes of communicating the existing curricula rather than designing new ones.

Digital readiness in terms of both physical infrastructure and usability of digital services by institutions, teachers, parents and students from diverse ground-realities should act as respective baselines in personalising education using technology. The physical infrastructures include availability of digital devices, internet penetration, reliable network bandwidth, and affordability/access of/to reliable network connection. Usability of digital services requires knowledge of digital platforms, training to handle technology and use of those platforms. Digital divide is the absence of one or all of the above at individual level.

As was pointed out, such digital divides are prevalent at various levels in India: rural-urban, gender-related, age-group specific, and across generations. With digital readiness comes the challenge of shift in pedagogy from teaching using blackboards to teaching using a screen for teachers. Similarly, for students, it is the state of mental wellbeing from the absence of peer groups and a safe communal space called "school" that provides a conducive environment for learning opportunities.

Below are some specific points of importance from the discussion:

- Appropriate adoptability of technology to specific streams/areas in education that best suit the purpose of the discipline is essential. This is one of the objectives of the National Educational Technology Forum (NETF) to be set up under the New Education Policy (NEP).

- To be cautious of over-dependence on technology in education as an outcome of an inferior equilibrium in the Indian education system. This is a reflection of inefficiencies in the system due to institutional weaknesses in the country. Mushrooming of informal tuition centers and increasing inflow of money into 'edu-tech startups' highlight the weak-links of existing education system.

- Advantage of technology is that it allows one to customize and tailor content according to local contexts. Personalized contents could be made available using appropriate digital platforms. Example: H-learning programme by Pratham which is a community based programme.

- When to personalize education for a child?
  Given that every child is unique, when standardized input is provided to all children of similar group, the result would be an uneven outcome. When personalized input is provided to each child, this would yield even outcomes. Technology is an important tool to personalize education to achieve more equitable outcomes. True, there are issues of digital divide that pose a constraint on utilization of technology, but there is another factor to be considered. It would be useful to think systematically about the use of technology by school grade years. Example, children till grade three should have relatively less engagement with technology, like exposure to edutainment that fosters audio-visual stimulations in the overall learning process.

- Democratisation of education
  Technology allows for democratisation and decentralisation of education. Teachers could share their knowledge with interested learners by being YouTubers and Bloggers, provided cyber-security is taken care of. Likewise, technology could accommodate wider aspirants in virtual classrooms as opposed to the capacity constraints posed by brick and motor classrooms.

- India is a diverse country, and one-size does not fit all
  To replicate and scale-up best practices rather than models in education due to deep (mutli-level) heterogeneity in the country.

- Exclusivity as a problem in the education system. For example, take the differentiation that exists within the government/state schooling systems, which is an under addressed issue in India. From the service provider's side, it is a one-size for every child as the public resources allocated for every child in school-going age is uniform across the country. The education system should be as inclusive as possible, and exclusivity by design in the system once again highlights institutional inefficiencies.

- India exhibits persistence of underdevelopment of certain institutions, and an increase of inequality; use of technology, in this manner, in specific domain(s) may add to the regressive nature of provision.

Continuing education during pandemic – Some achievements and some concerns

- Pandemic and National Education Policy (NEP) coincided to give technology an important place in the education provision in India.
- The pandemic has given an opportunity to understand the real digital divide in India (across regions and within social groups in a region).
- The scope of technology as an accelerator to bring about the "new normal" in the education domain during crisis is recognized.
- By leveraging from this experience, we could derive supplementary standard models in education using technology.
- Many schools are bound to be part of the digital teaching-learning process during the pandemic.
- Reach of teachers' training via digital platforms has seen an increase. For example, nearly 2 lakh CBSE teachers were trained the previous academic year.
- Diksha (school education) and Swayam (higher education) learning platforms by the Government of India (GoI) also provides MOOC (Massive Open Online Courses) for teachers. State Governments have collaborated with the GoI to make this content available in regional languages.
- Potential drop-outs from the education system could be those who remain untouched due to digital divide, and may have a zero academic year due to the pandemic.

Questions to reflect on

- How can technology be used to customize education for marginalized groups like children with special needs and disabilities?
- To plan for sharing of digital infrastructure from sharing of physical infrastructure in the education ecosystem for e-schooling.
- At present, edu-tech maybe an attractive business option for start-ups to venture into, but what would its implication be in the next 10 years?
- To find ways to track and measure the progress of individuals apart from marks and results. Can there be an Educational Quality Index?
- Are the digital divide and learning divide highly correlated?
- Over dominance of English and lack of learning materials in regional languages. Can technology be used to bridge this gap?
- Need for more evidence of what happens within school systems and inside classrooms. How can data be used to bridge this gap in understanding
- To explore the role of cyber security in education policy, and education technology platforms.
- How can we make technology a part of the progressive social change in India?

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About IDF: IDF is powered by the belief that rigorous research should inform debates, discussions and decisions on matters of public policy. Over the past 16 years of IDF's journey, the organization has worked with over 80 partners including Governments, multilaterals, corporates and civil society organisations. IDF's research is based along four pillars: fostering an innovation economy; using technology for developmental objectives; enhancing India's human capital; and measuring the efficacy of development policies. More info on: www.idfresearch.org

About CDF: CDF was launched on 30th October, 2019, with a vision to conduct actionable research on the impact of digitization on the economy and society. The inquiries are analytical, without any pre-determined bias, multi-dimensional and evidence-based and provides policy and regulatory insights that enable the transition to an optimal digital economy and society. The Centre was established and incubated as an entity by the India Development Foundation (IDF), a private non-profit research organisation set up as a Trust in 2003. More info on: www.cdfresearch.org