BCG BOSTON CONSULTING GROUP

Google for Education

Equipping, Enabling, and Advancing Digital Education in India

September 2021

SCHOOLNET
LEARNING FOR LIFE

This report has been commissioned by Schoolnet and sponsored by Google.

BCG BOSTON CONSULTING GROUP

Google for Education

Boston Consulting Group partners with leaders in business and society to tackle their most important challenges and capture their greatest opportunities. BCG was the pioneer in business strategy when it was founded in 1963. Today, we work closely with clients to embrace a transformational approach aimed at benefiting all stakeholders—empowering organizations to grow, build sustainable competitive advantage, and drive positive societal impact.

Our diverse and global teams bring deep industry and functional expertise with a range of perspectives that question the status quo and spark change. BCG delivers solutions through leading-edge management consulting, technology and design, and corporate and digital ventures. We work in a uniquely collaborative model across the firm and throughout all levels of the client organization, fueled by the goal of helping our clients thrive and enabling them to make the world a better place.

Learning sits across everything we do at Google, and we believe access to great learning experiences is something that everyone deserves. It's why we built Google for Education, to equip schools and educators with more tools, resources, and training to help transform teaching and learning, so that every student can realize their full learning potential.

We want to enable every education leader and decision maker to bring innovation to their schools at scale, with the peace of mind that they are investing in secure products that are flexible to their unique needs. We work each day to empower every educator by giving them simple, assistive tools so they can focus on what they do best: helping their students reach their full potential.

We strive to equip every student with the tools and skills they need to be successful, by focusing on inclusivity and accessibility, so we can meet students wherever they are. And we strive to evolve every day by continuing to listen and learn from you - the experts - and ensuring that as technology advances and improves, it's reflected in the tools we build for teaching and learning.

Working closely with educators, Google for Education brings the best of Google, to education. With Chromebooks, devices powered by Chrome OS, schools can provide every student and teacher with a personalized learning environment. With Google Workspace for Education and Classroom, they can design and deliver differentiated and engaging learning experiences that promote collaboration and creativity. And with a host of educational resources, educators can enhance and elevate class content.

FOREWORD

Seema Bansal
Partner and Director, Social Impact
Boston Consulting Group

The COVID-19 pandemic has no doubt disrupted education and learning as much as any other sector of the economy and civic life. Per UNESCO in April 2020, over 1.5 billion students worldwide were affected by school closures – with over half of those students facing economic and technical barriers to access education via other means. In India, over 250 million students faced the prospect of learning recession due to school closures across the country. Research, across time horizons and geographies, indicates that learning outcomes drop even with short breaks in learning. One can only imagine the impact of the extended lockdowns of the last year.

Expectedly, remote and digital learning saw an unprecedented uptake as students, teachers, school systems and policy makers adapted quickly to online classes, content, and learning amidst the shutdowns. Despite inadequate infrastructure and limited connectivity posing challenges, teachers adapted to available digital tools for communication, lesson delivery and student assessments.

It was in this context that BCG partnered with Google for Education and Schoolnet to assess the impact of digital tools' rollout on adoption, usage and effectiveness of online learning. The goal was to evaluate if providing access to a suite of interoperable digital tools could positively impact their adoption and use; and understand the potential path forward for widespread rollout.

Serving in the impact assessment role, BCG had a front-row seat to the at-scale rollout of digital tools to over 50,000 teachers across 3 different states in India. Using a fairly robust framework, we have compiled detailed data and information that sheds light on how teachers adopt and use digital tools, what they use it for, why they prefer certain tools over others, what benefits they realize from using digital tools in teaching, and how they plan to integrate digital tools into their teaching even after the shutdowns end.

What emerges from the report is a vivid picture of the benefits that digital tools can unlock in school education – across access to better content, more effective lesson planning, classroom management and student assessments. It also points to the willingness (and indeed, desire) from teachers to adopt and use digital tools as an integral part of their teaching for the context-specific purposes that would most benefit their students.

Recognizing that the complexity and heterogeneity of India's education system inherently requires solutions to adapt to varying requirements, the report presents a flexible yet comprehensive approach to experiment, equip, and enable school systems, administrations, and teachers within a strategic roadmap. Engaging a broad set of stakeholders across public, private, and social sectors to deliver their respective parts can truly deliver the promise of blended (physical-digital) learning for students in India in the years to come.

FOREWORD

Sapna Chaddha
Marketing Director for India and South East Asia
Google for Education

2020 was a challenging year for all of us. The global health pandemic has forced us to adapt to new ways of doing things. Like many other sectors, education has also undergone a massive transformation. The community came together on a scale and at a speed never experienced before.

For years, we have worked to expand access to technology inside and outside classrooms, and make learning opportunities more accessible. This mission became even more relevant and important when COVID-19 led school closures disrupted the continuity of education for more than 320M students in India.

Teachers started looking for digital solutions to connect with their students. From setting up online classrooms to engaging students in the new normal of study-from-home, many educators started virtual education for the first time. To make this transition easy and be helpful to teachers and students, we launched the Teach from Anywhere hub. Available in English and 8 Indian languages, this information hub provides videos and tips and has helped more than 9 Lakh users to get started with remote teaching.

While we were heartened by the response to these resources, we realized we could do more by providing a hands-on experience. When CBSE, Kendriya Vidyalaya, and the Education Ministries of Maharashtra and Delhi State Governments started large-scale digital capacity-building efforts, we worked with them to provide knowledge and access to Google Workspace for Education tools like Google Classroom, Google Meet and more. Till date, more than 5 Lakh teachers have benefited from these webinars on using digital tools for pedagogy and skill development. We are thankful to our partner, Schoolnet India to implement this program at scale.

When we started this initiative, we knew we would have to factor for immense diversity in educators from different demographic backgrounds with a range of teaching needs and variable digital maturity. We are immensely grateful for the partnership with Boston Consulting Group in conducting this assessment study to help us understand various implementation models, test hypotheses, and share recommendations with the ecosystem on driving digital transformation at scale.

We look forward to working with the ecosystem to continue to bridge the gaps using our technology and platforms, so that every student across the country has equal access to learning and opportunities they rightfully deserve.

SECTOR EXPERTS' VIEWS

Ashish Dhawan
Central Square Foundation

"

The COVID-19 crisis was a Sputnik moment for EdTech which enabled continued learning for children during school closures. It is crucial that we continue to harness this momentum and think of EdTech as more than just a fallback option. EdTech has massive potential to help children ace foundational skills and improve learning outcomes. It offers personalized support to children, professional development to teachers, and builds parental capacity for meaningful engagement in learning activities at home — all of which are in line with the goals outlined in the NEP 2020. Growing global evidence has shown that EdTech has the power to leapfrog learning – here in India, and across the world.

"

Aditya Natraj
Gandhi Fellowship

"

COVID-19 has resulted in teachers rapidly adopting digital technologies at a pace like never before. The real opportunity now is to see if we can use this momentum to realise the potential of EdTech to "FLIP" classrooms and create personalised learning experiences that are more meaningful for children and teachers rather than transitioning the traditional didactic education online.

"

ABBREVIATIONS

ASER: Annual Status of Education Report

B.Ed.: Bachelor of Education

CBSE: Central Board of Secondary Education

CPD: Continuous Professional Development

DELIMa: Digital Educational Learning Initiative Malaysia

DOE: Department of Education

EdTech: Education Technology

FGD: Focus Group Discussions

GIGA: Global Innovation Gateway for All

HOD: Head of Department

IAMAI: Internet and Mobile Association of India

ICT: Information and Communication Technology

IT: Information Technology

ITE: Integrated Approach to Technology in Education

KITE: Kerala Infrastructure and Technology for Education

KOOL: KITE's Open Online Learning

KV: Kendriya Vidyalaya

MCQ: Multiple Choice Question

MoU: Memorandum of Understanding

MS: Microsoft

NEP: National Education Policy

PII: Personally Identifiable Information

PISA: Programme for International Student Assessment

PSI-PMI: Progressive Science Initiative and Progressive Mathematics Initiative

PTM: Parent Teacher Meeting

SCERT: State Council of Educational Research and Training

SDG: Sustainable Development Goal

UDISE: Unified District Information System for Education

UNESCO: United Nations Educational, Scientific and Cultural Organization
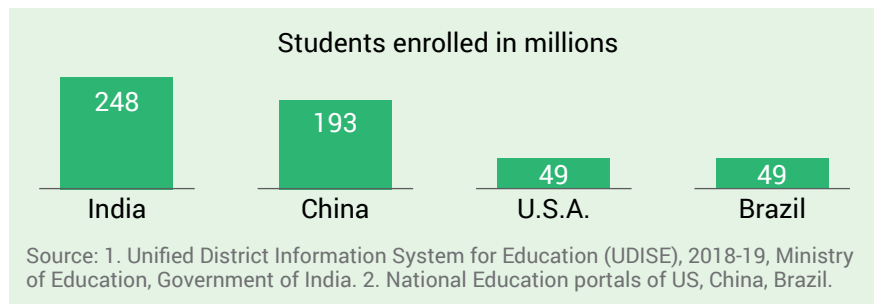
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01

EXECUTIVE SUMMARY

What is the motivation for digital in education?

Overview

India has the world's largest schooling system
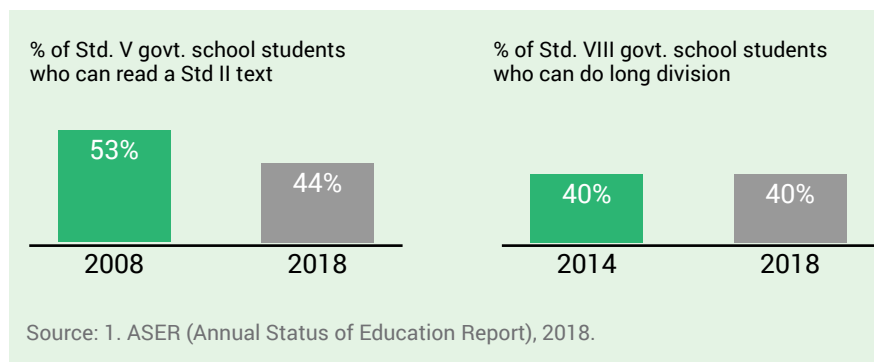
- 250 million+ students enrolled, ~52% of whom are enrolled in the public school system

Students enrolled in millions

India	China	U.S.A.	Brazil
248	193	49	49

Source: 1. Unified District Information System for Education (UDISE), 2018-19, Ministry of Education, Government of India. 2. National Education portals of US, China, Brazil.

- Annual budget allocation for schools rising by ~INR 17,000 crore in the past 5 years
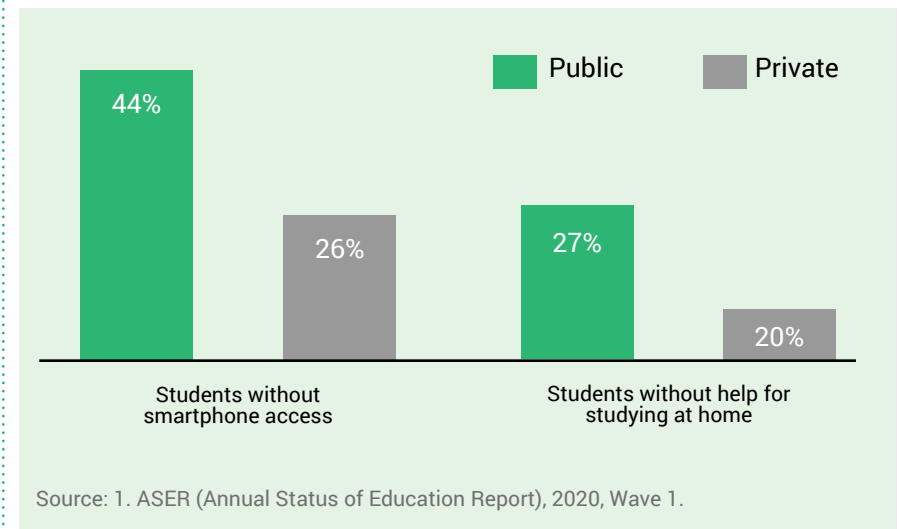
However, learning outcomes have remained subpar

- Decline seen in reading competency in 2018 (versus 2008), and no visible improvement in numerical skills of children in 2018 (versus 2014)

% of Std. V govt. school students who can read a Std II text

2008	2018
53%	44%

% of Std. VIII govt. school students who can do long division

2014	2018
40%	40%

Source: 1. ASER (Annual Status of Education Report), 2018.

Impact of COVID-19 pandemic

Discontinuity in education due to COVID-19 will exacerbate the problem of poor learning outcomes

- COVID-19 pandemic temporarily disrupted education for 250 million+ students in India
- Even as online education started, 40%+ of public school students do not have access to a smartphone[4]

Public / Private

	Students without smartphone access	Students without help for studying at home
Public	44%	27%
Private	26%	20%

Source: 1. ASER (Annual Status of Education Report), 2020, Wave 1.

- This issue was prevalent especially for students from low-income families and in rural areas

Limited focus on 21st century skills and widening urban-rural divide[1]

- Students from low-income families and rural areas do not have the opportunities to develop digital-era skills
- This includes leveraging internet access for information and learning, collaboration, critical thinking, innovation, and creativity, etc.

1. Digital in India Report, 2018, Internet and Mobile Association of India (IAMAI).

The National Education Policy (NEP)[1] recognizes learning outcomes and 21st century skills as critical for India; advocates adoption of digital in education to achieve its stated goals

> NEP 2020 will ensure the holistic development of learners. We have to advance our students with 21st century skills. These 21st century skills will be: Critical Thinking, Creativity, Collaboration, Curiosity, Communication.
>
> - Prime Minister Shri Narendra Modi[2]

NEP 2020 recommends leveraging digital in education to improve outcomes in 2 key areas

Learning outcomes
Improving foundational literacy, and numeracy through competency-based learning and education

21st century skills
Intersection of learning, digital literacy, and life skills needed for the 21st century economy

Small-scale pilots and research[3] into digital in education found the following benefits

Improved ICT (Information and Communications Technology) and reading skills among students

Higher research and analytical skills

Higher student engagement and increased attendance rate

Improved continuity, option to teach-from-anywhere

NEP advocates for adoption of digital in education, with a focus on the following key areas

Investments in digital infrastructure

Creation and dissemination of high-quality content

Teacher training and development

Experimentation with digital learning models

Policy-driven roadmap for digital transformation

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1. National Education Policy 2020. **2.** ANI. 2020. 'We have to equip students with 21st-century skills, NEP will ensure holistic development: PM Modi.' HRWorld, Economic Times
3. Includes PSI-PMI Project in Gambia in partnership with the World Bank and initiatives in India by agencies like Tata Trusts, etc.

Leveraging digital solutions in education is a multi-dimensional challenge

Digital access divide

○ Device access[1]: Urban areas and higher socio-economic groups are over-indexed on device access, even as public schools and rural communities lack access to basic ICT infrastructure such as projectors

○ Internet penetration[2]: Low internet access in rural areas, with only 32% of people aged 12+ having access to internet versus 54% in urban areas, further hampers the ability to adopt digital in education

Access to relevant content

○ Quality of content: Access to high-quality, reliable, context-specific, curated content is a key barrier to adopting digital in education for both teaching and lesson-planning as well as for delivering relevant materials for practice and self-assessment

○ Coverage: Available content on various competencies is often spread out across disparate channels further complicating access and use; especially true for underserved subjects and languages such as Home Science, Urdu and Oriya, etc.

Digital literacy among teachers and students

○ Digital use cases[3]: Only 8.3% of Indian youth and adults reported that they have created electronic presentations, and only 9.1% of Indian youth and adults have transferred files between computers and other devices

Wide range of application requirements

○ Range of activities: Wide range of activities in teaching and education - online worksheets, testing and assessments, video-based lesson delivery, multi-modal communication, administration and record-keeping etc. - require several tools and applications

○ Integration of tools: Severe lack of interoperability and integrated usage needs pose challenges to adopting cohesive digital methods
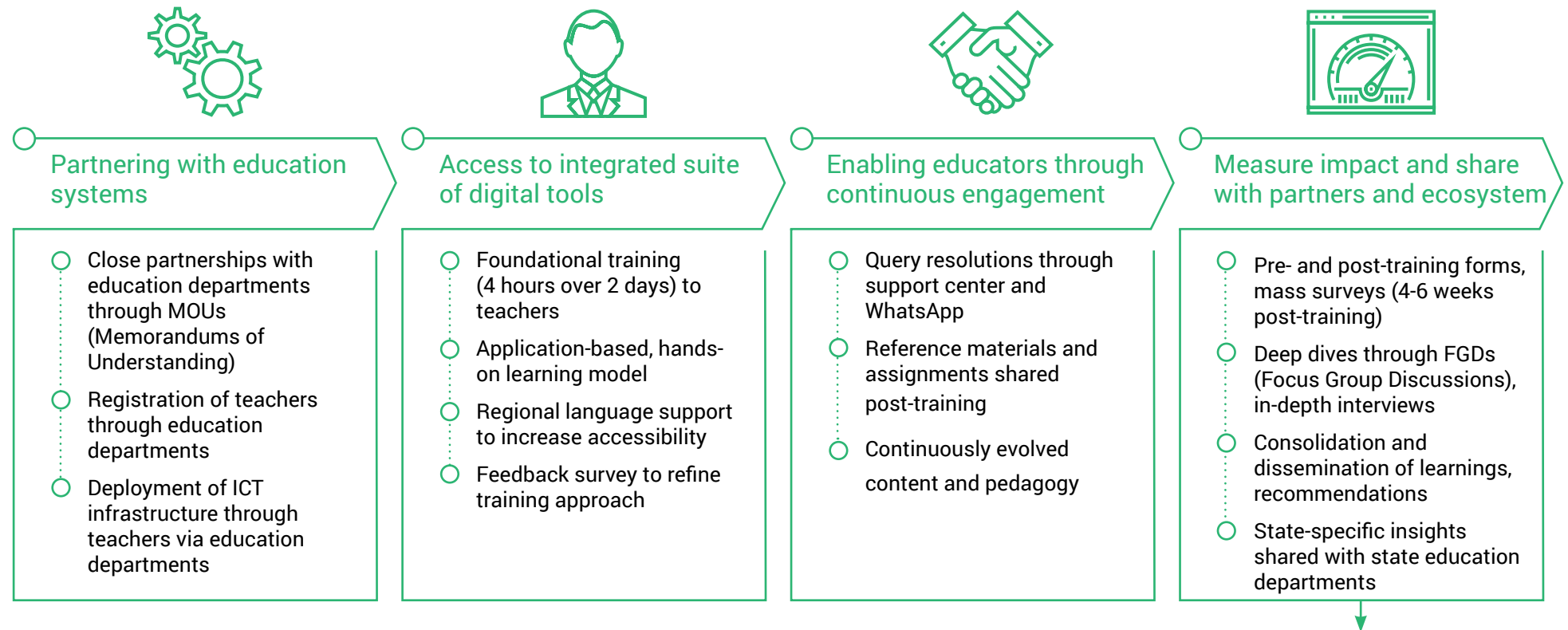
Organizational and bureaucratic engagement

○ Scalability of solutions: Successful digital education efforts at the small-scale have struggled to scale due to the size of India's public education system with varying contexts even within states

○ Organizational coordination: Many levers of organizational and bureaucratic coordination and buy-in required to migrate to digital solutions

1. ASER (Annual Status of Education Report), 2020, Wave 1. **2.** Digital in India Report, 2018, Internet and Mobile Association of India (IAMAI). **3.** Technical Cooperation Group on the Indicators for SDG 4, UNESCO.

In keeping with the goals of the NEP, Google for Education partnered with State Education Departments on a project to identify the unlocks and impacts of digital transformation in education

Partnering with education systems

- Close partnerships with education departments through MOUs (Memorandums of Understanding)
- Registration of teachers through education departments
- Deployment of ICT infrastructure through teachers via education departments

Access to integrated suite of digital tools

- Foundational training (4 hours over 2 days) to teachers
- Application-based, hands-on learning model
- Regional language support to increase accessibility
- Feedback survey to refine training approach

Enabling educators through continuous engagement

- Query resolutions through support center and WhatsApp
- Reference materials and assignments shared post-training
- Continuously evolved content and pedagogy

Measure impact and share with partners and ecosystem

- Pre- and post-training forms, mass surveys (4-6 weeks post-training)
- Deep dives through FGDs (Focus Group Discussions), in-depth interviews
- Consolidation and dissemination of learnings, recommendations
- State-specific insights shared with state education departments

Ethical Safeguards:

Throughout this study and report development, strong protections for privacy and data protection were followed. Neither Google for Education nor Boston Consulting Group had access to personally identifiable information (PII) of the survey sample or respondents.

We maintained additional protections via

- 'Blind' (random) selection of survey respondents for cohort representation using masked PII
- Aggregating analysis and reporting to evaluate cohort-level trends and findings only
- Utilizing third-party implementation partner to handle all raw data, direct contacting, and automated masking of PII

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Project approach evaluated the impact of digital transformation across 3 diverse education systems within India

System 1

Indian city-state government school system with 2700+ schools, 82k+ teachers, and 2.2 million+ students[1]

Low-income households with internet penetration of 68% and intermediate levels of familiarity and access to digital devices[2]

System 2

Large Indian state government school system with 66k+ schools, 250k+ teachers, and 5.6 million+ students[3]

Rural, low-income households with internet penetration of 50% and low levels of familiarity and access to digital devices[4]

System 3

Country-wide school system with over 1200 schools, 46k+ teachers, and 1.2 million+ students[5]

Higher familiarity and access to digital devices

Using this holistic, multi-context approach, the goal was to validate and develop the following

Efficacy of digital learning and teaching
Establish evidence for impact on students, teachers, and ecosystem

Scalability of digital solutions
Confirm relevance and applicability of digital solutions across wide range of use cases and contexts

Recommendations for digital transformation
Develop policy-driven roadmap to drive at scale adoption and use of digital teaching and learning methods

…using quantitative & qualitative data throughout teachers' digital adoption journey

Registration and pre-and post-training data from teachers

Surveys administered to teachers 4-6 weeks post-training

Focus Group Discussions and 1:1 interviews

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1 & 3. Unified District Information System for Education (UDISE), 2018-19, Ministry of Education, Government of India. **2 & 4.** Digital in India Report, 2018, Internet and Mobile Association of India (IAMAI). **5.** Kendriya Vidyalaya Sangathan, Annual Report 2018-19.
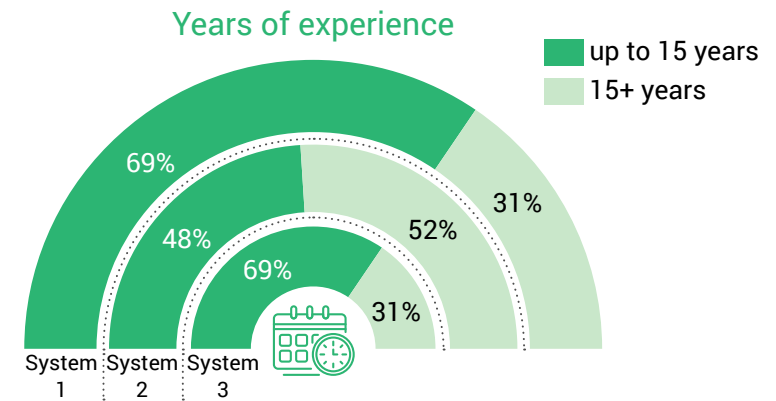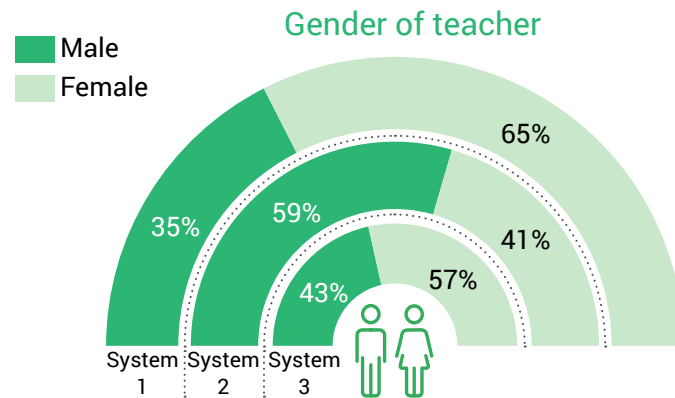
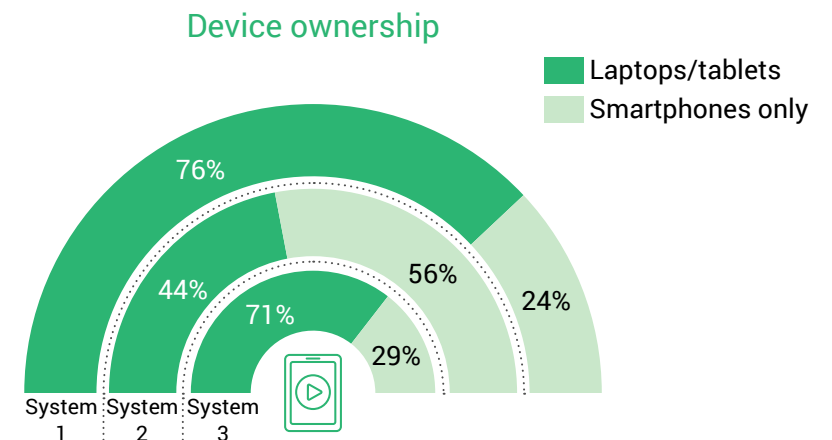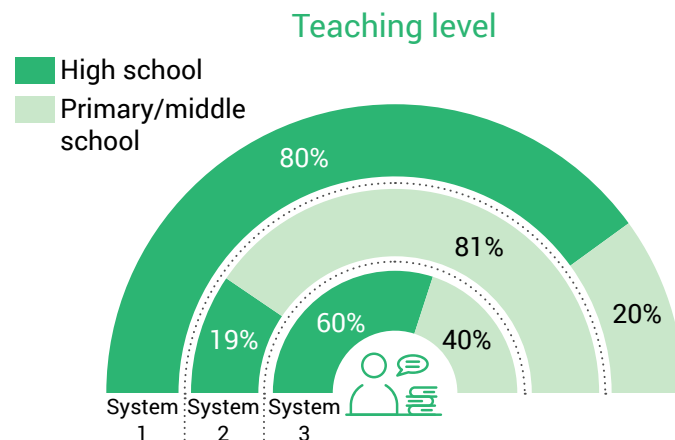*The content of this report is owned by Schoolnet.*

IMPACT

Audience| Demographics and digital nativity varied across the 3 education systems, providing the opportunity to test efficacy of digital in education across multiple contexts

Demographics

Gender of teacher

Legend:
- Male
- Female

- System 1: Male 35%, Female 65%
- System 2: Male 59%, Female 41%
- System 3: Male 43%, Female 57%

Years of experience

Legend:
- up to 15 years
- 15+ years

- System 1: up to 15 years 69%, 15+ years 31%
- System 2: up to 15 years 48%, 15+ years 52%
- System 3: up to 15 years 69%, 15+ years 31%

Digital Nativity

Teaching level

Legend:
- High school
- Primary/middle school

- System 1: High school 80%, Primary/middle school 20%
- System 2: High school 19%, Primary/middle school 81%
- System 3: High school 60%, Primary/middle school 40%

Device ownership

Legend:
- Laptops/tablets
- Smartphones only

- System 1: Laptops/tablets 76%, Smartphones only 24%
- System 2: Laptops/tablets 44%, Smartphones only 56%
- System 3: Laptops/tablets 71%, Smartphones only 29%

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Motivation to attend training | Teachers were driven by self-motivation, necessity during lockdown, and word-of-mouth; nudges from state education departments helped drive training attendance

Teachers were nudged by messages from official sources

In their own words...

" We came to know about the training through our WhatsApp group, we received a circular on it.

% of survey respondents

Interested in using Google for Education tools to teach students to learn better
75%

Needed during lockdown to connect to students
65%

Heard it was useful for teaching/admin work
40%

Required by school district/state
13%

Other teachers were using them
10%

Students/guardians[1] requested to use
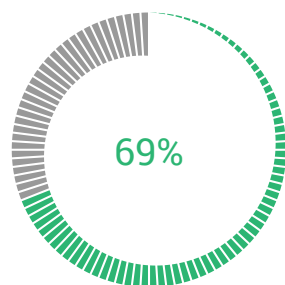**05%**

1. Refers to both parents and guardians

*The content of this report is owned by Schoolnet.*

01 Engaging state education departments for training and rollout resulted in high (~70%) adoption of digital in education

69%

Used Google for Education tools regularly

02 Teachers predominantly used Google for Education tools to conduct online classes and quizzes, and to store and share student data

Conducted online quizzes	66%
Conducted online classes	56%
Maintained and shared attendance, scores	42%
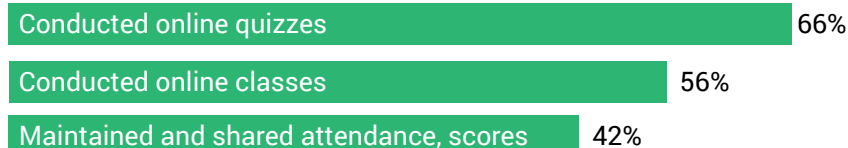
" I take classes 3 times a week for every section on Google Meet.

I use Google Sheets to store all my students' attendance data.

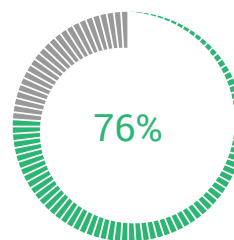- quotes from teachers in the study

03 Training enabled teachers to unlock more use cases of digital in education, which led to them using more tools

% of teachers who adopted 5+ Google for Education tools

Trained teachers — **75%**

Untrained teachers — **47%**

04 Teachers are optimistic about using Google for Education tools after schools reopen

76%

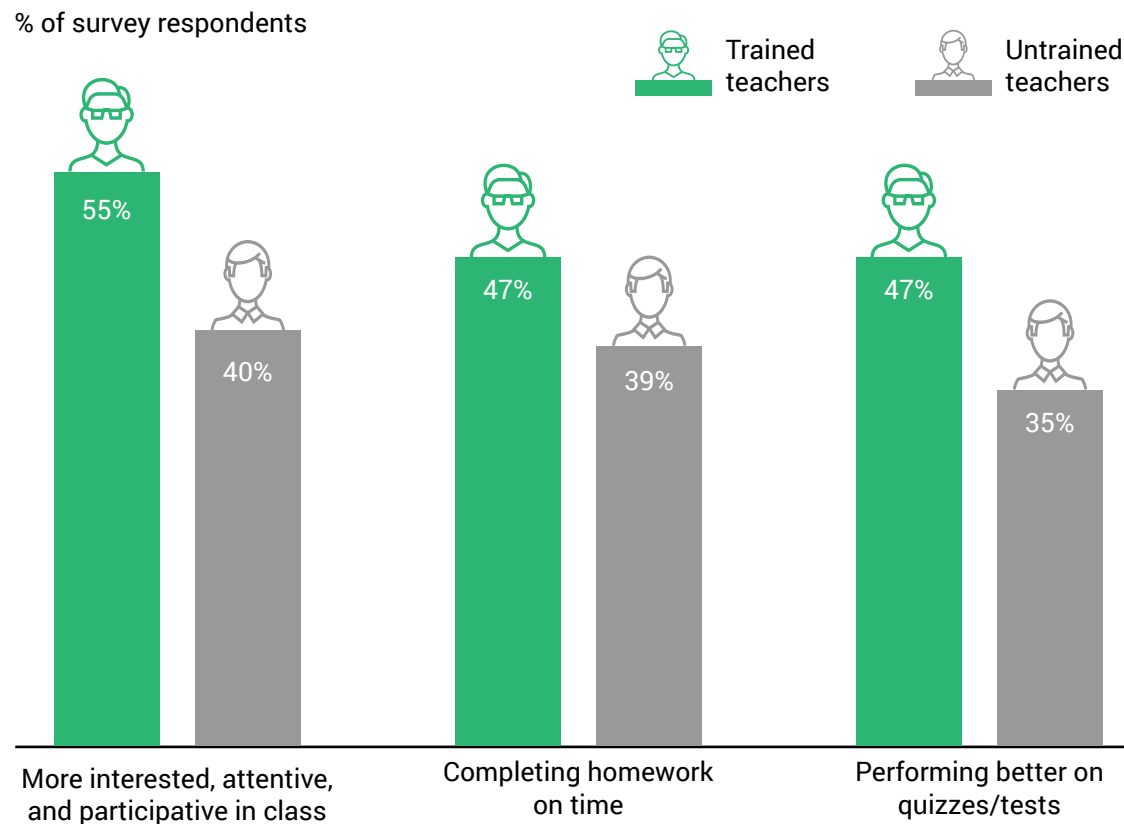Plan to use Google for Education tools regularly in the future

" I will use Google Meet to invite external speakers to talk to my students.

I plan to continue using Google Forms to conduct revision tests and post-chapter tests.

We have a digital class in our school; I plan to use Google Slides to show presentations to my students there.

- quotes from teachers in the study

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Impact | Post adoption of Google for Education tools, teachers report better student engagement and performance

Significant improvement in student interest and attentiveness in class, along with their performance in quizzes and tests

% of survey respondents

Trained teachers **Untrained teachers**

- More interested, attentive, and participative in class: Trained 55%, Untrained 40%
- Completing homework on time: Trained 47%, Untrained 39%
- Performing better on quizzes/tests: Trained 47%, Untrained 35%
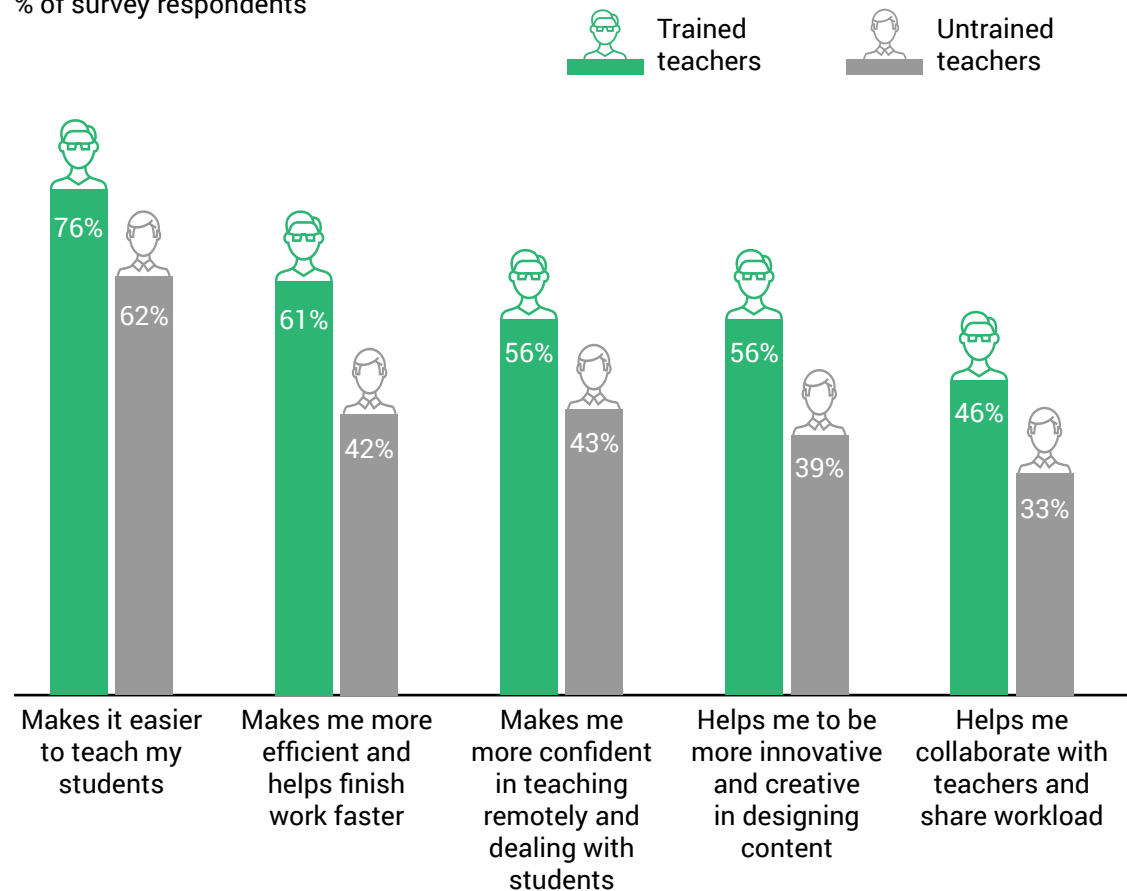
"

In their own words...

○ Adopting digital in education enabled students to develop 21st century skills

"My students have used Google Meet to share their own presentations with the class."

"My students are clearing their own doubts by using Google Search and Google Lens."

○ Responsiveness and student interest in class and assessments also improved

"Students are fascinated by Google Forms tests because they like the MCQ (Multiple Choice Question) options. They also get marks immediately, so students are more excited to do Google Forms quizzes."

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Impact on teaching | Benefits from digital extend beyond remote teaching – to efficiency and creativity; with trained teachers recognizing benefits at higher rates

Key benefits for teachers extend across efficiency, innovation, and collaboration

% of survey respondents

Trained teachers　　Untrained teachers

	Makes it easier to teach my students	Makes me more efficient and helps finish work faster	Makes me more confident in teaching remotely and dealing with students	Helps me to be more innovative and creative in designing content	Helps me collaborate with teachers and share workload
Trained	76%	61%	56%	56%	46%
Untrained	62%	42%	43%	39%	33%

In their own words...

Revision is easier through recorded Google Meet videos

"Revision is now easy for students. Even if they didn't pay attention, they can watch the class video again later and learn."

Voice typing on Google Docs gets work done faster

"I use voice typing with Google Docs, it helps me make question papers faster than by typing."
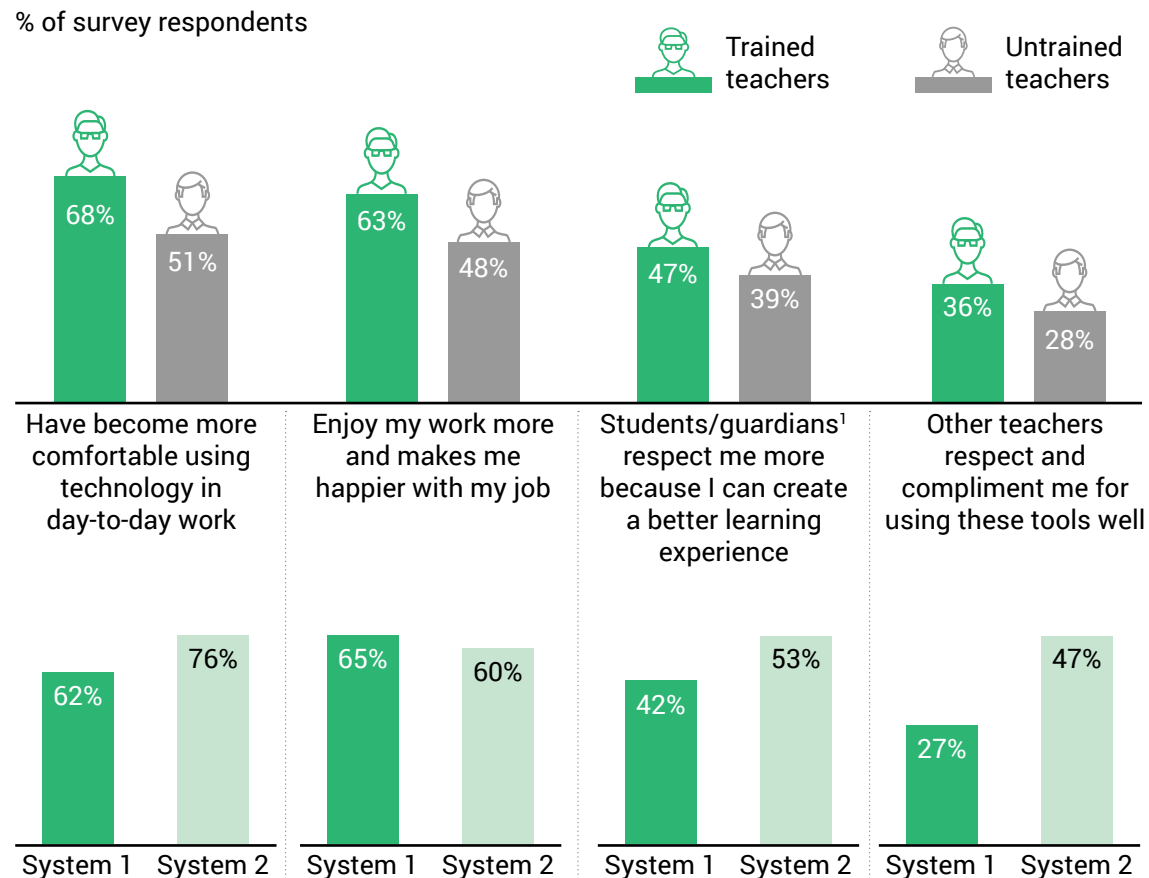
Teachers find it easier to share visual content

"When we were teaching in school, it was not easy to share pictures or videos with students. Now using Google tools I can share them easily."

Google Sheets help organize data better

"All my data is in one place, it takes less time to search and find data when the HOD (Head of Department) or the Principal asks for it."

Impact on teaching | Teachers report socio-emotional benefits – especially greater comfort with technology, happiness at work and social validation from gaining digital skills

Socio-emotional gains from digital in education particularly prominent in System 2 versus System 1

% of survey respondents

Trained teachers **Untrained teachers**

	Have become more comfortable using technology in day-to-day work	Enjoy my work more and makes me happier with my job	Students/guardians[1] respect me more because I can create a better learning experience	Other teachers respect and compliment me for using these tools well
Trained	68%	63%	47%	36%
Untrained	51%	48%	39%	28%

	System 1	System 2	System 1	System 2	System 1	System 2	System 1	System 2
	62%	76%	65%	60%	42%	53%	27%	47%

1. Refers to both parents and guardians

" In their own words...

Teachers became more digitally literate and comfortable with tools

"We may be experts in our subjects, but our technology knowledge was not that good. I am happy to update myself with the times and it makes me more confident."

Increased student engagement made teachers happier

"Training helped break the monotony of teaching. One picture is worth a 1000 words and students are more entertained now."
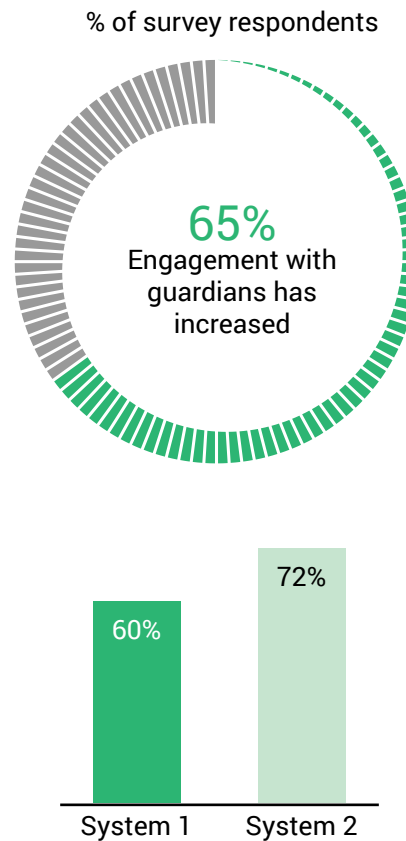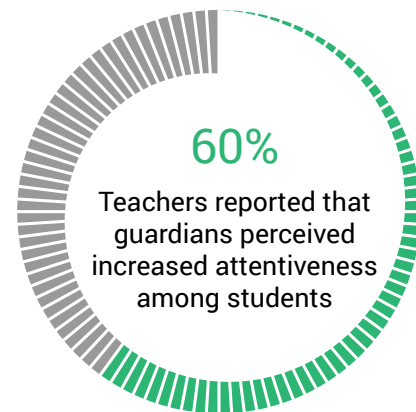
Respect from peers and colleagues increased self-esteem

"We have got more respect from our Vice-Principal too – they ask us about how we conduct quizzes using digital tools and we then explain it to them."

Parental response | Students' guardians[1] perceived increased interest from their wards and were more engaged with teachers, especially in rural areas

% of survey respondents

60%
Teachers reported that guardians perceived increased attentiveness among students

65%
Engagement with guardians has increased

System 1: 60%
System 2: 72%

In their own words...

○ **Everyday interaction between teachers, students, and guardians has increased** –

"I am not restricted by the 45 minute class timing anymore. I can connect with students even in the evening or during weekends."

"We take PTM with parents via online mode now. I feel we are more connected with them compared to before."

○ **Guardians show higher involvement in their child's education** –

"If we don't send videos everyday, parents immediately call and check."

"Some parents sit with their kids in the online classes also."

Source: 1955 respondents to survey including 1436 from the test group, 519 respondents from the control group. **1.** Refers to both parents and guardians

CASE STUDY :
KENDRIYA VIDYALAYA (KV)

Case Study | In the KV system, a cascaded training model combined with best practices in training and support led to high adoption and benefits for both teachers and students

Background

Google for Education partnered with KVs to facilitate adoption of digital in education

03
Regions

161
Schools

6.6k
Teachers
28k+ teachers across all KV regions

215k
Students

Implementation

Comprehensive train-the-trainer model adopted for rollout & training

- ○ 600 trainers trained directly
- ○ 28k+ teachers trained through cascaded trainings

Schools adopted best practices to disseminate trainings & enable teachers to adopt Google for Education tools

- ○ Adoption of Google for Education mandated by KV regional leadership
- ○ Phase-wise training, refresher training, and demo classes
- ○ Instruction manuals, videos, and tech support for teachers
- ○ Coordinated efforts to increase awareness among parents/guardians
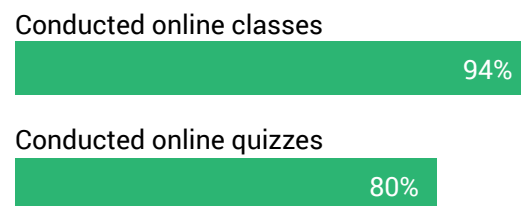
Impact

Adoption | Administration mandate, best practices in training and post-training support led to high adoption of Google for Education tools
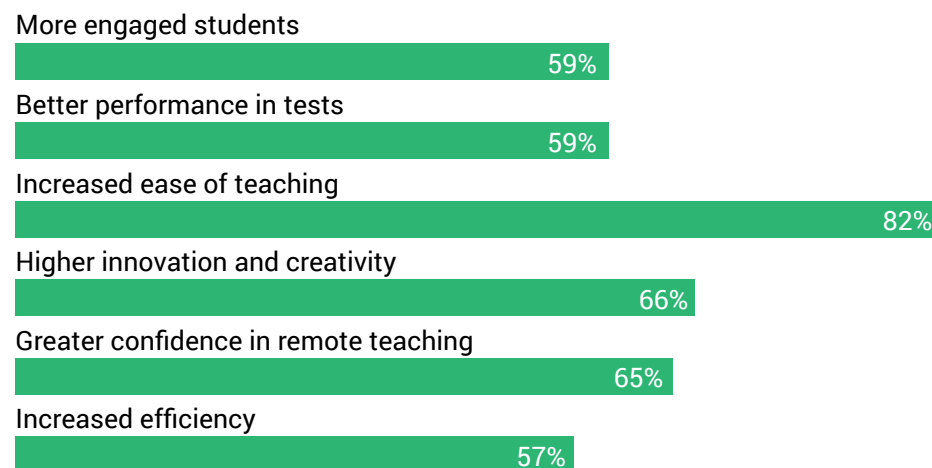
95%

Used Google for Education tools regularly

Conducted online classes
94%

Conducted online quizzes
80%

Teacher impact | Teachers perceive better engagement and performance from students; they also realize direct benefits (creativity, efficiency)

More engaged students
59%

Better performance in tests
59%

Increased ease of teaching
82%

Higher innovation and creativity
66%

Greater confidence in remote teaching
65%

Increased efficiency
57%
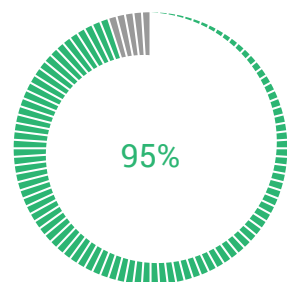
Student impact | Students demonstrate improved digital literacy with the inclusion of digital in education

" Now students are more informed, more tech-savvy, and enriched with a variety of learning resources.

– quote from a KV school administrator

" Teachers are more smart, productive, and tech-savvy. They are utilizing their quality time in effective ways through Google tools"

– quote from a KV school administrator

Path ahead

Schools plan to integrate digital after schools reopen, with use cases expected to evolve digital in learning

" Google Classroom can be used even after school reopens to give extra remedial help to individual students and short objective tests. It can also be used during vacations.

Now these tools will be part of our education system. They will be used for meetings and sharing of educational resources.

- quotes from KV school administrators

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RECOMMENDATIONS

Addressing key adoption enablers and existing barriers will drive further uptake of digital in education

Broadening access to digital devices

During this project, there was higher (10-15%+) regular usage among teachers with laptops or tablets versus teachers with only smartphones, with ~75% of teachers citing the need for better internet and access to digital devices

Equip

Enabling access to relevant, organized content

~60% teachers identified the need for better content, pointing to difficulties in finding relevant, high-quality, curated content; especially for some (underserved) subjects and in some low-coverage languages

Equip

Creating user communities, support networks

~40% of teachers cited the need for additional support after training; engagement through smaller groups of teachers could be used to build support networks to drive further adoption of digital in education

Enable

Creating awareness among parents/guardians

~45% of teachers cited the need to educate parents/guardians about digital tools; lack of awareness hindered the adoption of digital learning by students, due to the lack of parental familiarity with and distrust of digital
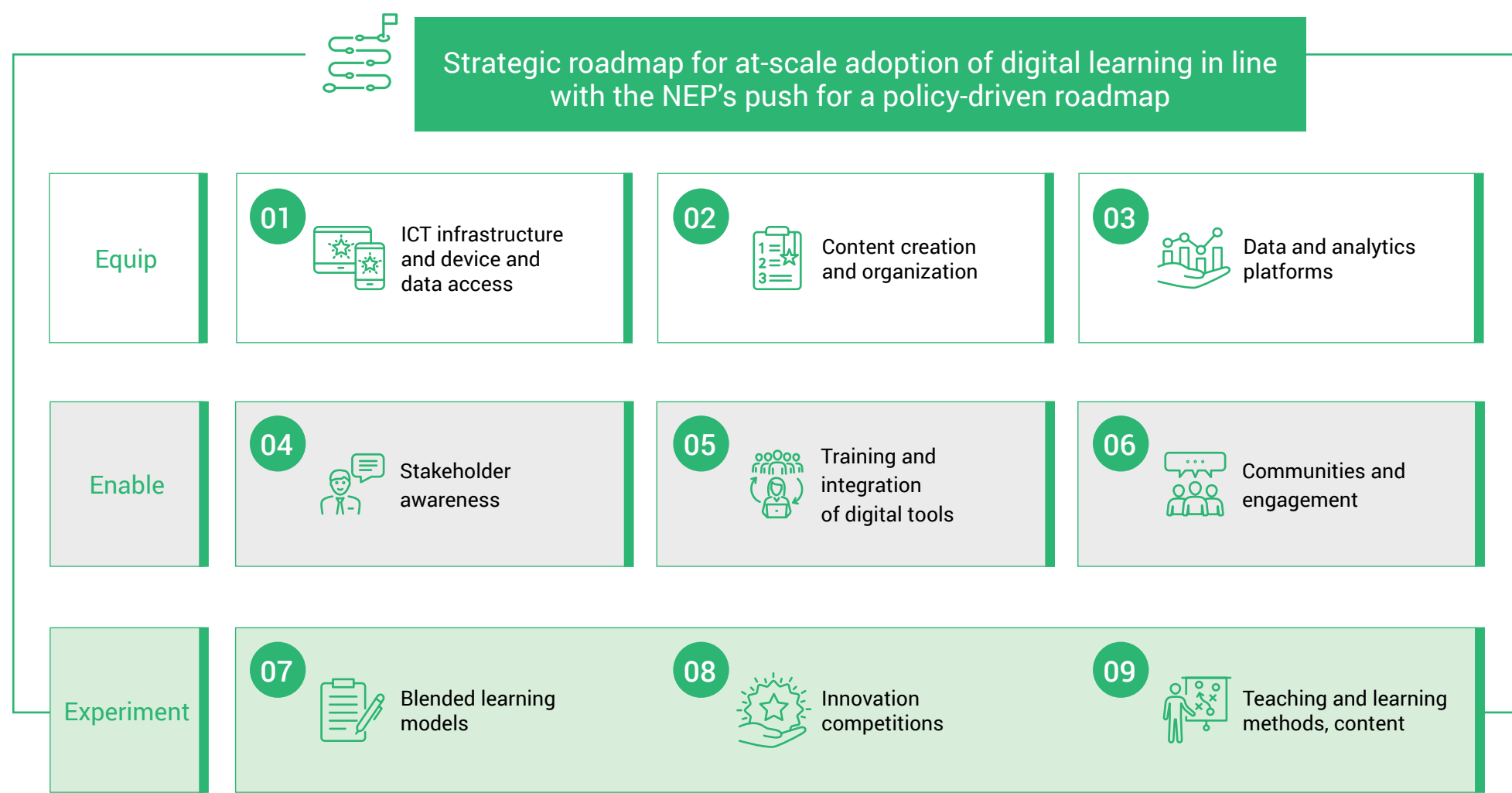
Enable

Expanding training and practice opportunities

~40% of teachers cited more training and practice opportunities as a key enabler to usage; training can unlock more usage of digital tools and more intense usage, driving higher benefits for teachers along with greater adoption
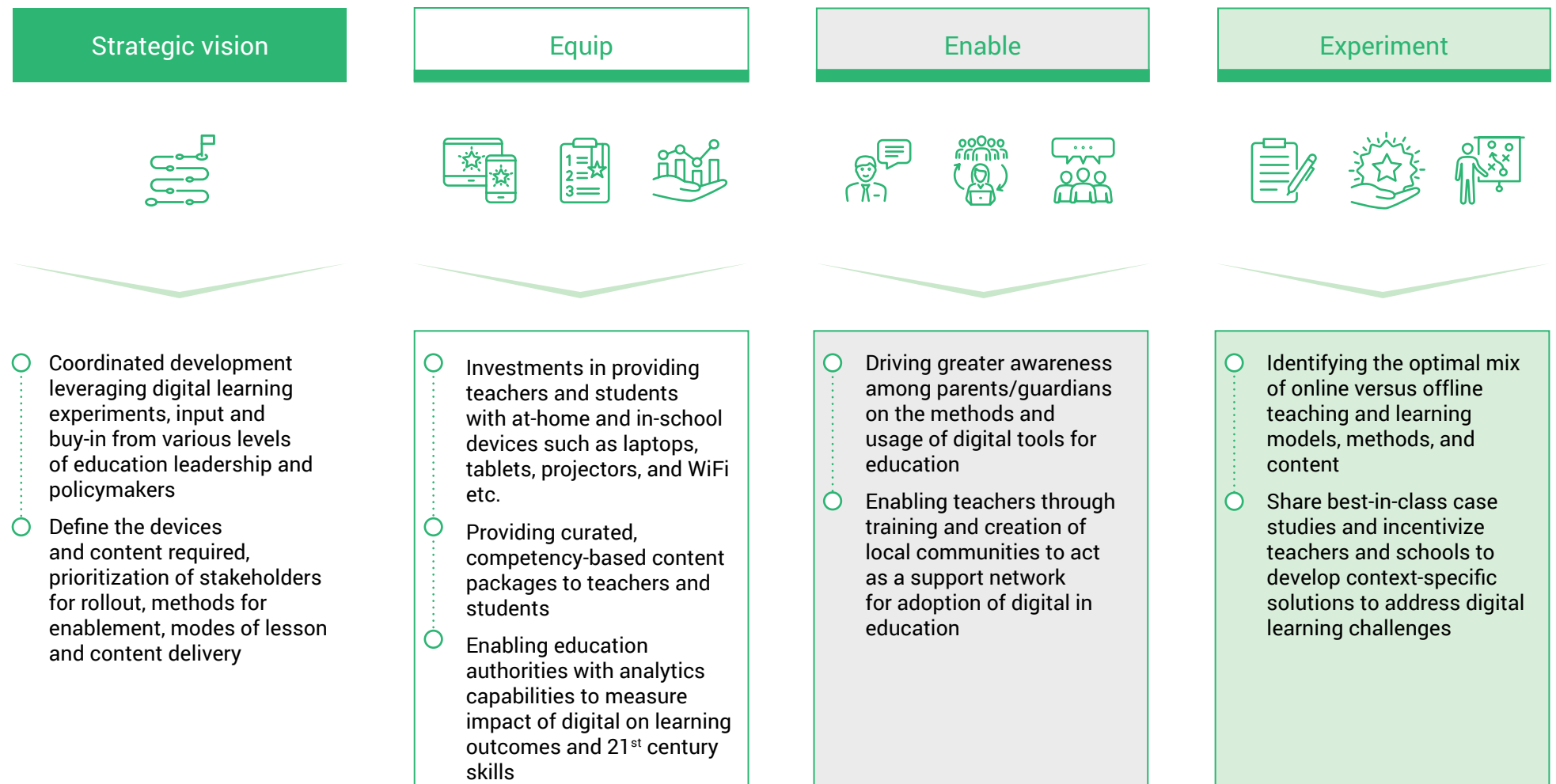
Experiment

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The path forward involves integrating an ecosystem of public, private, and social sector players to enable key elements within a comprehensive strategic vision

Strategic roadmap for at-scale adoption of digital learning in line with the NEP's push for a policy-driven roadmap

Equip

01 ICT infrastructure and device and data access

02 Content creation and organization

03 Data and analytics platforms

Enable

04 Stakeholder awareness

05 Training and integration of digital tools

06 Communities and engagement

Experiment

07 Blended learning models

08 Innovation competitions

09 Teaching and learning methods, content

Equip and Enable strategies will be driven by a coordinated, experimentation-driven strategic vision for at scale adoption of digital in education

Strategic vision	Equip	Enable	Experiment

Strategic vision
- Coordinated development leveraging digital learning experiments, input and buy-in from various levels of education leadership and policymakers
- Define the devices and content required, prioritization of stakeholders for rollout, methods for enablement, modes of lesson and content delivery

Equip
- Investments in providing teachers and students with at-home and in-school devices such as laptops, tablets, projectors, and WiFi etc.
- Providing curated, competency-based content packages to teachers and students
- Enabling education authorities with analytics capabilities to measure impact of digital on learning outcomes and 21st century skills

Enable
- Driving greater awareness among parents/guardians on the methods and usage of digital tools for education
- Enabling teachers through training and creation of local communities to act as a support network for adoption of digital in education

Experiment
- Identifying the optimal mix of online versus offline teaching and learning models, methods, and content
- Share best-in-class case studies and incentivize teachers and schools to develop context-specific solutions to address digital learning challenges

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02

DETAILED REPORT

BOSTON CONSULTING GROUP

MOTIVATION FOR DIGITAL IN EDUCATION

Even with the world's largest schooling system, learning outcomes remain poor with the education system not yet conducive to imparting 21st century skills in India

India has the largest school education system in the world
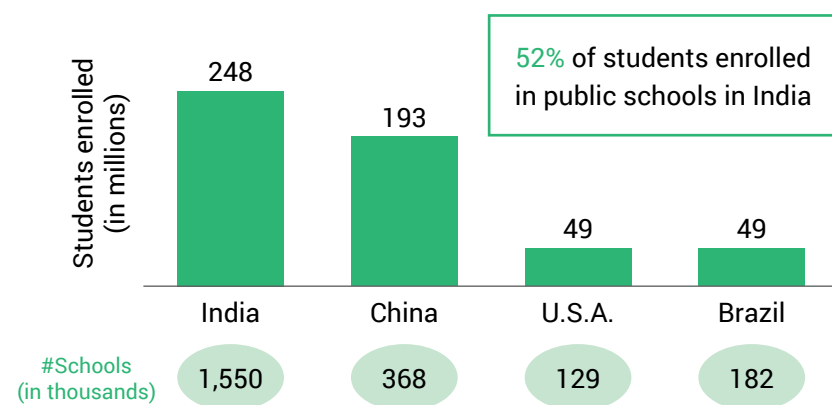
Students enrolled (in millions)

- India: 248
- China: 193
- U.S.A.: 49
- Brazil: 49

52% of students enrolled in public schools in India

#Schools (in thousands)

- India: 1,550
- China: 368
- U.S.A.: 129
- Brazil: 182

Source: **1**. Unified District Information System for Education (UDISE), 2018-19, Ministry of Education, Government of India. **2**. National Education portals of US, China, Brazil.

However, learning outcomes lag behind other developing countries

PISA

- India ranked 2nd last (72nd among the 74 participating countries) in the Programme for International Student Assessment (PISA) survey, 2009
- China's Shanghai province scored the highest in reading, and also ranked highly in mathematics and science

India / Brazil

- % of students in grade 2 or 3 with minimum proficiency level in reading: India 47%, Brazil 80%
- % of students in grade 2 or 3 with minimum proficiency level in mathematics: India 53%, Brazil 71%

Source: **1**. PISA: Programme for International Student Assessment 2009.

India's current education system is not conducive for development of inter-disciplinary 21st century skills

Rigid separation of disciplines
- Early specialization and streaming of students into narrow areas of study
- Existence of hierarchies among and silos between different areas of learning

Focus on theoretical learning
- High emphasis on rote learning and learning for exams
- Less importance given to collaborative, project-based learning

Stark digital divide
- Lack of ICT facilities in public schools and rural schools
- Low digital familiarity among students, guardians[1], and teachers from rural and low-income profiles

1. Refers to both parents and guardians

Need to revamp the education system is well recognized; NEP[1] aims to achieve this by improving students' skills and learning in tandem with upskilling teachers

NEP 2020 was released with the goal of overhauling the education system in India, with a focus on 3 key areas:

Learning outcomes
The NEP recommends shifting to an experiential, competency-based learning approach to achieve universal foundational literacy and numeracy by 2025

21st century skills
To develop 21st century skill sets, the NEP recommends the adoption of a holistic, multi-disciplinary approach to education at all levels

Teacher training and development
To achieve the above outcomes, the NEP recommends a revamp of the B.Ed. (Bachelor of Education) program to include new-age courses[2]

21st century skills

Learning skills	Literacy skills	Life skills
4Cs	IMT	FLIPS
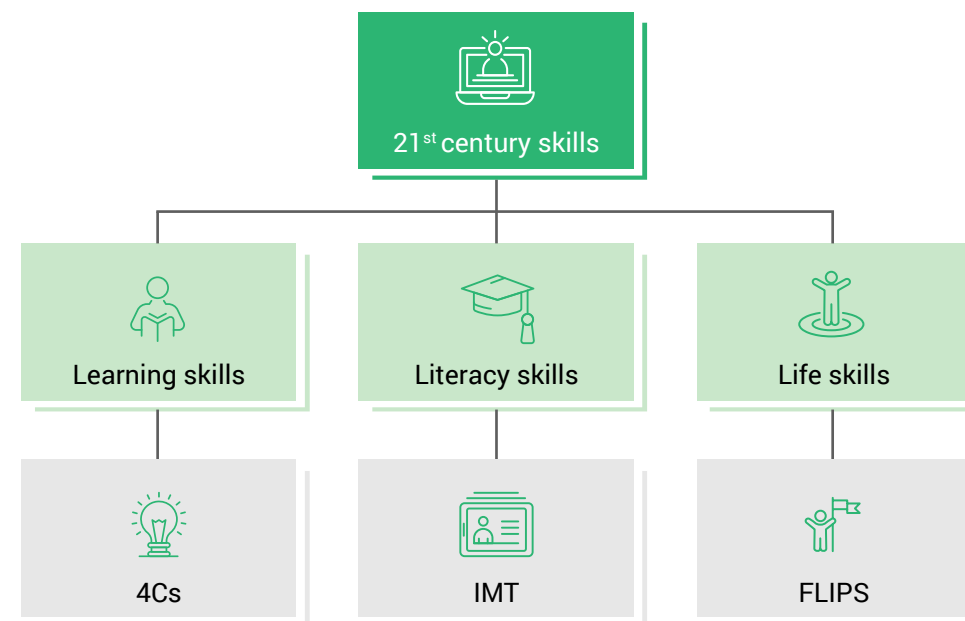
4Cs: Critical Thinking, Creativity & Innovation, Collaboration, Communication

IMT: Information Literacy, Media Literacy, Technology Literacy

FLIPS: Flexibility and Adaptability, Leadership and Responsibility, Initiative and Self-Direction, Social and Cross-Cultural Interaction

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1. National Education Policy 2020; **2.** Along with 50 hours of mandatory Continuous Professional Development (CPD) training every year.

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Digital interventions in education have proved promising, with numerous small-scale studies establishing their benefits; NEP also calls for holistic inclusion in education

Pilot studies on digital in education point to improved learning outcomes and benefits for teachers

1 PSI-PMI[1] Project in Gambia in partnership with World Bank

- Pilot project in 24 secondary schools; integrated interactive whiteboards with smart responders provided to students in class
- Impact on student performance:
  - 46% increase in students' average score in mathematics
  - 3-fold increase in students who obtained credit in both mathematics & english, a criterion for college admission
- Impact on teacher efficiency: 80% mathematics teachers and 95% science teachers reported improved teaching effectiveness and learning

2 Integrated Approach to Technology in Education (ITE)

- Study by Tata Trust, piloted in Murshidabad, West Bengal, and then scaled to 18 locations across India, covering 17k+ students
- Impact on student performance: Adoption of digital, enabled increased student attendance and average test scores in the pilot
- Impact on teacher efficiency: Teachers showed increased comfort with digital tools, by adopting digital project-based approaches for other subjects that were not covered by the study

NEP recognizes the need for digital in education through a holistic approach that involves

Pilot studies for online education

Studies to evaluate the benefits of digital in education while mitigating potential downsides

Development of digital infrastructure

Investments to create open, interoperable, evolvable, public digital infrastructure in education

Digital repositories for content dissemination

Creation of content repositories with coursework and learning games, with a clear rating system for effectiveness

Training and incentives for teachers

Training teachers in learner-centric pedagogy and enabling them to become high-quality online content creators

Establishing standards for digital in education

Creation of standards on content, technology, and pedagogy to help formulate guidelines for e-learning across the ecosystem

1. Progressive Science Initiative and Progressive Mathematics Initiative

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However, applying digital solutions at scale is a multi-dimensional challenge

Adoption of digital in education faces structural barriers posed by digital access divide and lack of digital literacy...

...as well as difficulties posed by the varying nature of contexts across India's education ecosystem

Rural areas lag significantly behind urban areas in access to the internet

Rural
32%

Urban
54%
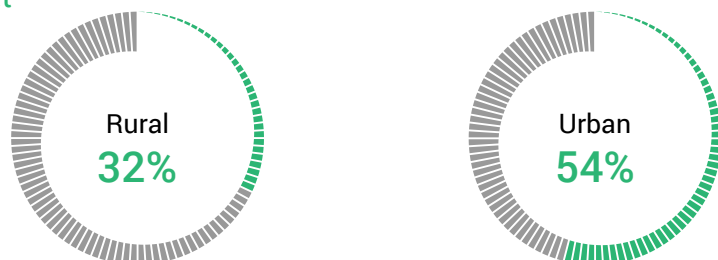
% of people above the age of 12 with access to the internet

Source: **1.** Digital in India Report, 2018, Internet and Mobile Association of India (IAMAI).

India lags behind other emerging countries in terms of digital literacy standards defined by UNESCO[1]

- India
- Indonesia
- Malaysia

30%
24%
8%

% of youth and adults who have created electronic presentations

51%
45%
9%

% of youth and adults who have transferred files electronically
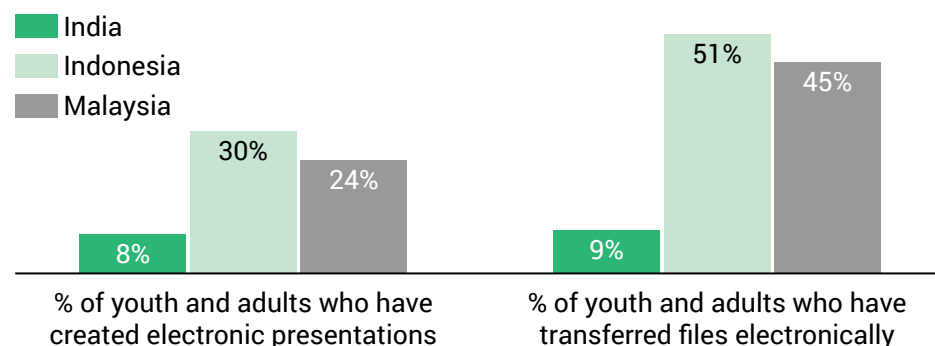
Source: **1**. Technical Cooperation Group on the Indicators for SDG 4, UNESCO.

Wide-range of applications required
Teachers lack access to tools that allow for interoperability and integration over a wide range of teaching and non-teaching activities

Access to relevant content
Due to India's unique diversity in languages across and even within states, there is a shortage of curated and organized content in low-coverage regional languages

Organizational and bureaucratic engagement
The scale and diverse nature of the education ecosystem make it difficult to achieve coordination and buy-in for large-scale digital transformation initiatives

PROJECT APPROACH

Program approach | Using learnings from previous initiatives, Google for Education partnered with State Education Departments to design a large-scale digital transformation initiative

Various initiatives abroad illustrated the need for buy-ins from centralized stakeholders to achieve large-scale impact

○ **Malaysia's DELIMa (Digital Educational Learning Initiative Malaysia)** initiative leveraged close involvement of Ministry and state-level leadership to monitor and scale adoption of Google for Education across 450k teachers and 3 million students

○ **Indonesia** deployed Google for Education across 35 million teachers and students, along with the provision of Google Chromebooks at elementary and middle schools through a government-led push for digitization

○ **Japan's GIGA (Global Innovation Gateway for All)** program aims to provide high-speed internet to every school and PCs (Personal Computers) and tablets to all students by 2023

Recognizing this need to partner with the leadership, Google for Education established close partnerships with state education departments

System 1: Urban schooling system in a large Indian city-state

System 2: Urban-rural schooling system in a large Indian state

System 3: Kendriya Vidyalaya (KV) school system

The goals and implementation plan for the initiative were finalized by working closely with education authorities from the above 3 systems

Design of the digital transformation initiative

Co-design program with state education departments
Executed in close partnership and with buy-ins from state education departments and administrative leadership

System-specific models to achieve scale
Targeting educators and administrators across 3 systems to impact students with varying levels of digital access and familiarity

Pilot, learn, adapt
Iterative build and learn approach adopted to develop best practices and a long-term roadmap

Program design | Google for Education adopted a holistic approach in partnership with the state education leadership to equip and enable teachers to adopt digital in education

1 Engagement with education leadership

- Established partnerships with state education departments
- Developed goals for digital transformation together with department leadership
- Obtained administrative buy-in for infrastructure rollout and teacher training
- Follow-up engagement with education departments to review progress and create long-term roadmap

2 Infrastructure setup and access rollout

- Equipped teachers with access to Google for Education suite of products
- Created dedicated portal to ease teachers' training experience
- Provided administration consoles to education departments to monitor macro-level adoption

3 Teacher training and enablement

- Training teachers across 3 systems through direct and cascaded training models
- 2 days of hands-on, activity-based sessions
- Post-training practice assignments to improve confidence with tools
- Support center set up for post-training support to clear queries

4 Impact assessment

- Assessment of pre-training baseline and incremental learnings during training
- Survey (4-6 weeks post training) to assess usage patterns
- Deep dives through FGDs to understand motivators and benefits
- In-depth interviews to highlight success stories

IT infrastructure deployment | Teachers were provided with access to Google for Education product suite with state education departments' support for at scale rollout

Senior education leadership were involved at all stages of infrastructure deployment

Program design and planning
Defining the goals of the Google for Education program, finalization of training and rollout plan

IT infrastructure rollout
Acceleration of teachers' sign-up through official circulars, creation of Google for Education accounts

Monitoring of adoption
Macro-level monitoring via dashboards and program refinements to improve adoption

Onboarding of state education departments

- Defined the goals of the Google for Education program in close discussions with state education departments
- Finalized training and rollout plan with buy-in from state education leadership[1]

Setup of IT infrastructure for training and rollout

- Invited teachers to register for access to Google for Education tools through circulars from state education departments, cascaded to teachers through heads of schools
- Provided IT support to state education departments to create and circulate Google for Education logins to teachers
- Created a customized portal to conduct training and gather feedback from trainees

Post-training analytics and monitoring

- Provided state education departments with an administration console to obtain macro-level insights about adoption of Google for Education tools
- Created provisions for rollout of administration consoles at school or block level in the future, for localized tracking and analysis (if needed)

1. like the Deputy Director of SCERT (State Council of Educational Research and Training, Delhi) and the Joint Director of DOE (Directorate of Education, Delhi)

Training methodology | Teachers were provided with hands-on training to enable effective adoption of Google for Education tools for context-specific use cases

Structure of the training program

- Conducted by Schoolnet India with BCG as the impact assessment partner

- 4 hours of training for batches of 70-100 teachers, spread over 2 days

Training program content

- Introduction to digital in education and advantages of adopting digital

- Overview of Google for Education tools and their applications for collaborative teaching

- Discussion of various content sources (YouTube, Google Search, etc.) that teachers can leverage to discover and share content

- Hands-on practical sessions with each Google for Education tool and application to real-life use cases

- Follow-up assignments provided 2 weeks after training to enhance familiarity with Google for Education tools

Snap-shots from the training program

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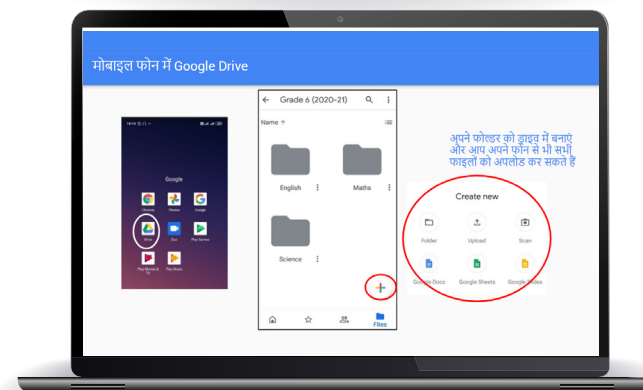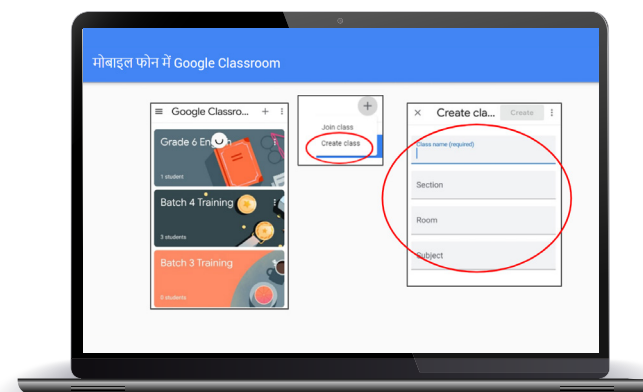
Impact assessment | Comprehensive impact assessment framework developed to track qualitative and quantitative metrics, and identify recommendations

The impact assessment approach was designed to achieve the following outcomes

Test efficacy of digital learning
Establish evidence of impact on teachers, students and ecosystem

Establish scalability of digital solutions
Confirm relevance and applicability of digital solutions across a wide range of use cases and contexts within India's education system

Drive recommendations for systematic transformation
Understand barriers and enablers to arrive at recommendations for a policy-driven roadmap for digital transformation

The framework incorporated self-reported data by teachers throughout their digital adoption journey

Registration and pre- and post-training forms
Establish baseline access and familiarity with digital tools among a wider population of trainees

Surveys (4-6 weeks post training)
Identify evolution of usage patterns, benefits, and impact among a sample of trainees

Focus Group Discussions (FGDs) and interviews
Deep dives with selected survey respondents to identify nuanced use cases, innovations, benefits, and barriers to adoption

1. Refers to both parents and guardians

Registration, pre- and post-training forms

Demographics (location, gender, experience)

Professional background (qualifications, teaching level)

Access to ICT (devices owned, IT support at schools)

Familiarity with digital tools (frequency of usage, tools used)

Intent to use digital tools (post-training confidence, willingness)

Survey, FGDs, interviews

Drivers of adoption (lockdown, self-interest, peer influence)

Nature of usage (which Google for Education apps, which other digital tools)

Prominent use cases (online classes, quizzes, tests)

Perceived benefits (ease of teaching, increased satisfaction)

Enablers and barriers (internet access, better content)

Report outcomes, findings

Uptake, usage of Google for Education tools (% use, key use cases)

Success stories from the ground (creative use cases, solutions from the field)

Perceived impact of Google for Education tools (satisfaction from teachers, students, guardians[1])

Barriers to adoption (drivers for dropping off, potential unlocks)

Drivers for adoption (reasons for continued usage, key enablers)

Way forward on digital education tools (ways to enable greater use, impact in schooling)

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Data analysis and sampling | Both quantitative and qualitative assessments were used to evaluate the impact of Google for Education rollout; and its subsequent adoption and use

Sources

Pre-/post-training forms

Surveys (4-6 weeks post training)

Focus Group Discussions

In-depth interviews

Data and analysis

Teacher demographics, device ownership, teaching levels, baseline familiarity, and intent to use digital tools

Evolution in usage patterns post training – frequency of use, common use cases, prominent benefits, and enablers

Deep dives on specific use cases, motivators for adoption, impact on self and community, future plans for digital tool usage

Highlight impactful success stories using real-life examples, specific context-based solutions

Sampling coverage

47,462 teachers' data collected from pre-/post-training forms

1,436 trainees surveyed across Systems 1 and 2

2,103 teachers from KVs surveyed separately through an open survey

92 teachers covered across 18 Focus Group Discussions

10 teachers interviewed individually

519 untrained teachers
Were designated as the control group and surveyed to isolate the impact of training

Statistical significance ensured
By ensuring sufficient sampling sizes, our results are robust with 95% confidence interval at a 5-6% margin of error

Ethical Safeguards:

Throughout this study and report development, strong protections for privacy and data protection were followed. Neither Google for Education nor Boston Consulting Group had access to personally identifiable information (PII) of the survey sample or respondents.

We maintained additional protections via

○ 'Blind' (random) selection of survey respondents for cohort representation using masked PII

○ Aggregating analysis and reporting to evaluate cohort-level trends and findings only

○ Utilizing third-party implementation partner to handle all raw data, direct contacting, and automated masking of PII

FINDINGS

UNDERSTANDING TEACHERS AND THEIR ADOPTION OF DIGITAL TOOLS

Chapter Summary

01 ~65% of trainees reported using digital tools regularly pre-training; adoption was mainly driven by COVID-19 induced lockdown

> Before the lockdown, we had no need to use digital tools.
>
> The lockdown came as a big shock to us. We started to find ways to keep in touch with students and not break their education.
>
> *- quotes from teachers in the study*

65%
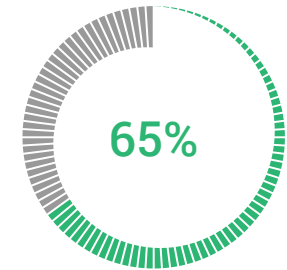
Used digital tools regularly, pre-training

02 ~87% of teachers used WhatsApp for lesson delivery pre-training
Aided by school authorities, ~45-60% of teachers also used Google Meet and/or Zoom

> My school principal is quite young, she encouraged us to start using digital apps to teach students.
>
> *- quote from a teacher in the study*

Used WhatsApp for lesson delivery, pre-training

87%

58% 47%   42% 46%

System 01   System 02

■ Used Google Meet
■ Used Zoom
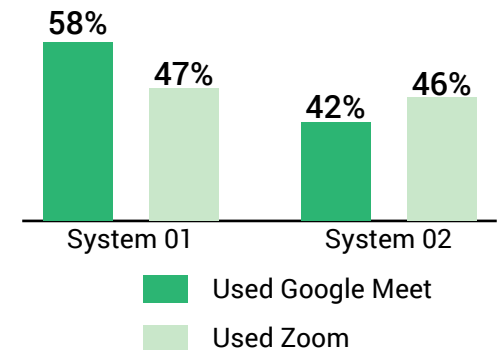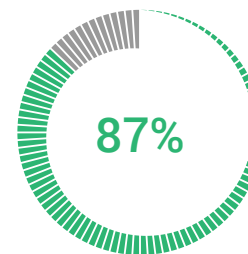
03 Trainees were segmented into 3 cohorts based on incoming familiarity with digital tools and intent to use digital tools post training

Digital Natives   Willing Experimenters   Nascent Adopters

DIGITAL MATURITY

Baseline usage | Driven by COVID-19 induced school lockdowns, nearly 2 out of 3 teachers used digital tools regularly pre-training; primarily to communicate with students and guardians[1]

Lockdown forced teachers to move online; most relied on existing channels of digital communication

COVID-19 induced lockdowns created a necessity for teachers to adopt digital tools

- As schools across the country closed down, teachers were initially unsure of what to do
- Aided by efforts from school and state authorities, teachers gradually adopted digital tools to teach students

Teachers primarily relied on WhatsApp cascades for lesson delivery

- Teachers used WhatsApp to send photos of their notes, self-made videos, audio recordings, and content from sources like YouTube and Diksha
- Students replied to teachers on WhatsApp by sending photos of their completed assignments and tests

WhatsApp cascades were the most prevalent channels for teachers to communicate with students and guardians[1]

65%

Teachers used digital tools regularly before the training-primarily WhatsApp cascades

1. Refers to both parents and guardians

Usage of WhatsApp for school work, pre-training

% of survey respondents

87% Online classes, record and send lessons

63% Conduct quizzes, tests, assignments

59% Share report cards and grades

56% Create and share lesson plans
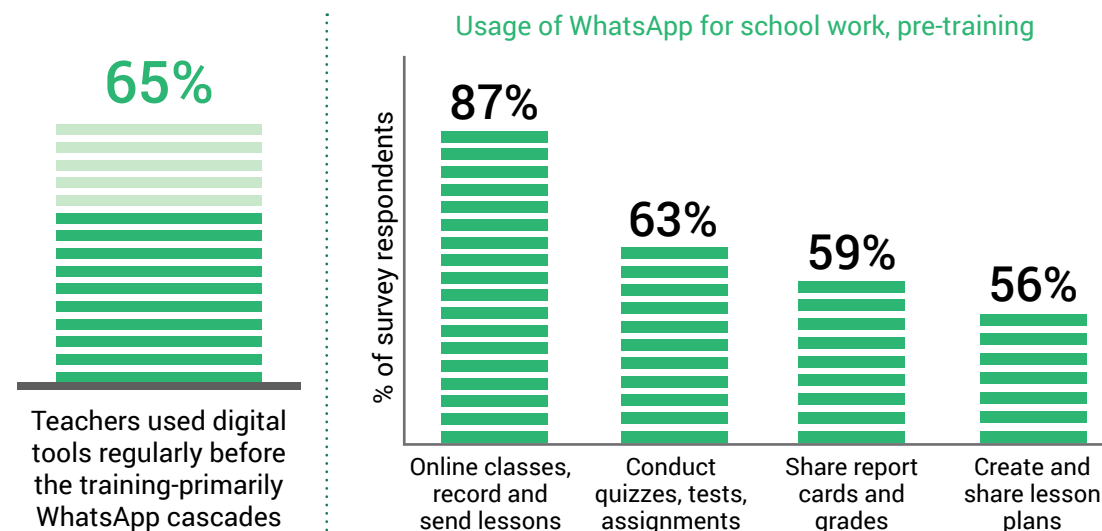
In their own words...

" The lockdown came as a big shock to us. We started to find ways to keep in touch with students and not break their education.

" Using Zoom was not very fruitful – parents did not know how to download it.

" Before the lockdown, we had no need to use digital tools.

" I used to write questions on paper and send the photo through WhatsApp. Students also replied through WhatsApp only.

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Teachers' usage of digital tools was limited to a small number of tools for lesson delivery and content sharing; low adoption of digital (<20%) for other activities

Teachers used a few digital tools for lesson delivery, content sharing

- 45-60% of trainees from both System 1 and System 2 reported using video conferencing tools such as Google Meet and Zoom before the training
- 25-30% of trainees adopted tools that facilitated sharing of interactive audio-visual content (YouTube, Microsoft PowerPoint)

Low pre-training usage of tools for other teaching and administrative activities

- Less than 1/4th of teachers across both systems reported using MS (Microsoft) Word, MS Excel, etc., indicating that teachers were still manually creating notes and recording data
- Teachers showed low adoption rates (<20%) for tools that enabled online collaboration with colleagues, such as Google Sheets and Google Docs

Initial attempts to use other tools such as Zoom and Google Meet were largely unsuccessful due to several barriers

- Lack of knowledge on how to use these tools
- Lack of devices among students
- Lack of awareness among guardians[1] on using digital tools for educational purposes

System 1 trainees

66%

Attendees used digital tools regularly, pre-training

Most used digital tools, pre-training

Tool	Value
Google Meet	58
Zoom	47
Audio-visual content	30
Google Sheets	23
MS Word	18
Google Docs	17
MS Excel	17
MS PowerPoint	17
Google Slides	06
MS Paint	05

"Using Zoom was not very fruitful – parents did not know how to download it.

System 2 trainees

63%

Attendees used digital tools regularly, pre-training

Most used digital tools, pre-training

Tool	Value
Zoom	46
Google Meet	42
MS Powerpoint	33
Audio-visual content	25
MS Word	22
MS Excel	19
Google Docs	15
Google Sheets	14
MS Paint	10
Google Slides	9

1. Refers to both parents and guardians

Engaging the state education departments | Leadership, administrative authorities provided support to teachers pre-training and encouraged them to attend the training

Support of state and school authorities during the lockdown enabled teachers to adopt digital in education

- Teachers received content such as videos and question papers regularly through school WhatsApp groups
- Government also provided resources such as worksheets, WhatsApp based self-assessment chat-bots, etc.

Support from state education departments was an important enabler of Google for Education training attendance

- Information about the Google for Education training was circulated to teachers through official circulars, along with the registration link
- Receipt of information from official sources lent credibility to the training, encouraging teachers to register

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Government and school authorities enabled teachers by sharing content during shutdown

> DOE sends worksheets regularly for my subjects, they are very helpful.

> Our school's principal created a WhatsApp group and he sends videos, links, question papers on it daily.

Some schools conducted internal trainings on digital tools

> Our school principal asked our computer teacher to conduct training for all the other teachers.

> My school principal helps us to find new ways to teach students.

Teachers were encouraged to attend the Google for Education training through official circulars

> We came to know about the training through our WhatsApp group, we received a circular on it.

> Our school sent a circular with a link to register for the training.

Teacher profiles | Training attendees varied across demographic, teaching level, and device access parameters among the 3 education systems

Demographics
- System 1 and 3: Predominantly female
- System 2: Mostly male

Teaching level and device access
- System 1 and 3: Likely to be high school teachers who owned laptops or tablets
- System 2: Predominantly primary and middle school teachers who only owned smartphones

Opportunity to test the efficacy of the training and rollout programme in different contexts
- System 1 and 3: Teachers expected to be more digitally-adept due to higher teaching levels and access to laptops and tablets
- System 2: Teachers expected to be less familiar with digital tools, due to lower teaching levels and limited access to laptops and tablets

TEACHERS GENDER

	Male	Female
System 1	35%	65%
System 2	59%	41%
System 3	43%	57%

TEACHING LEVEL

	High school	Primary/middle school
System 1	80%	20%
System 2	19%	81%
System 3	60%	40%

DEVICE OWNERSHIP

	Laptops/tablets	Smartphones only
System 1	76%	24%
System 2	44%	56%
System 3	71%	29%
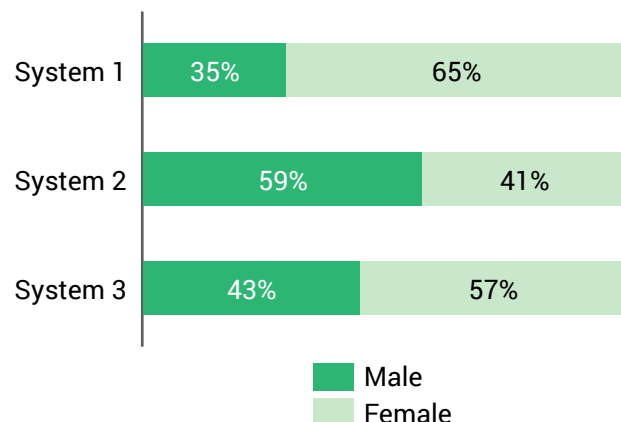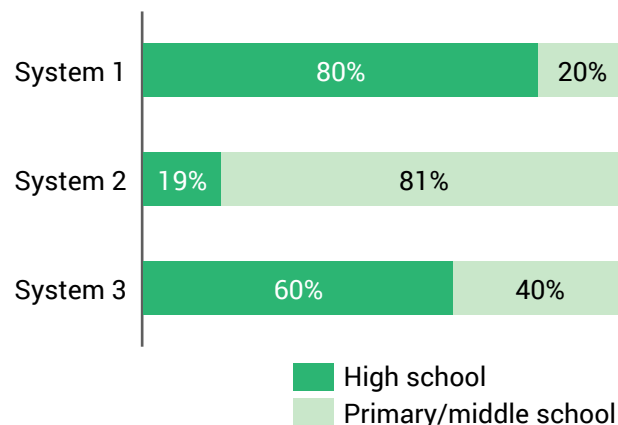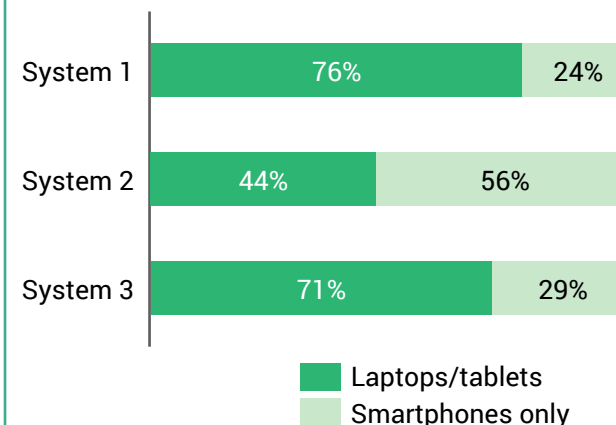
Cohorts of teachers | Teachers were grouped into 3 cohorts based on prior familiarity with digital tool usage, confidence levels, and intent to use digital tools

DIGITAL MATURITY

Cohort	Cohort characteristics	% of total training set
Digital Natives	High school + laptop/tablet	47%
Willing Experimenters	Primary/middle school + laptop/tablet .... High school + smartphone	34%
Nascent Adopters	Primary/middle school + smartphone	19%
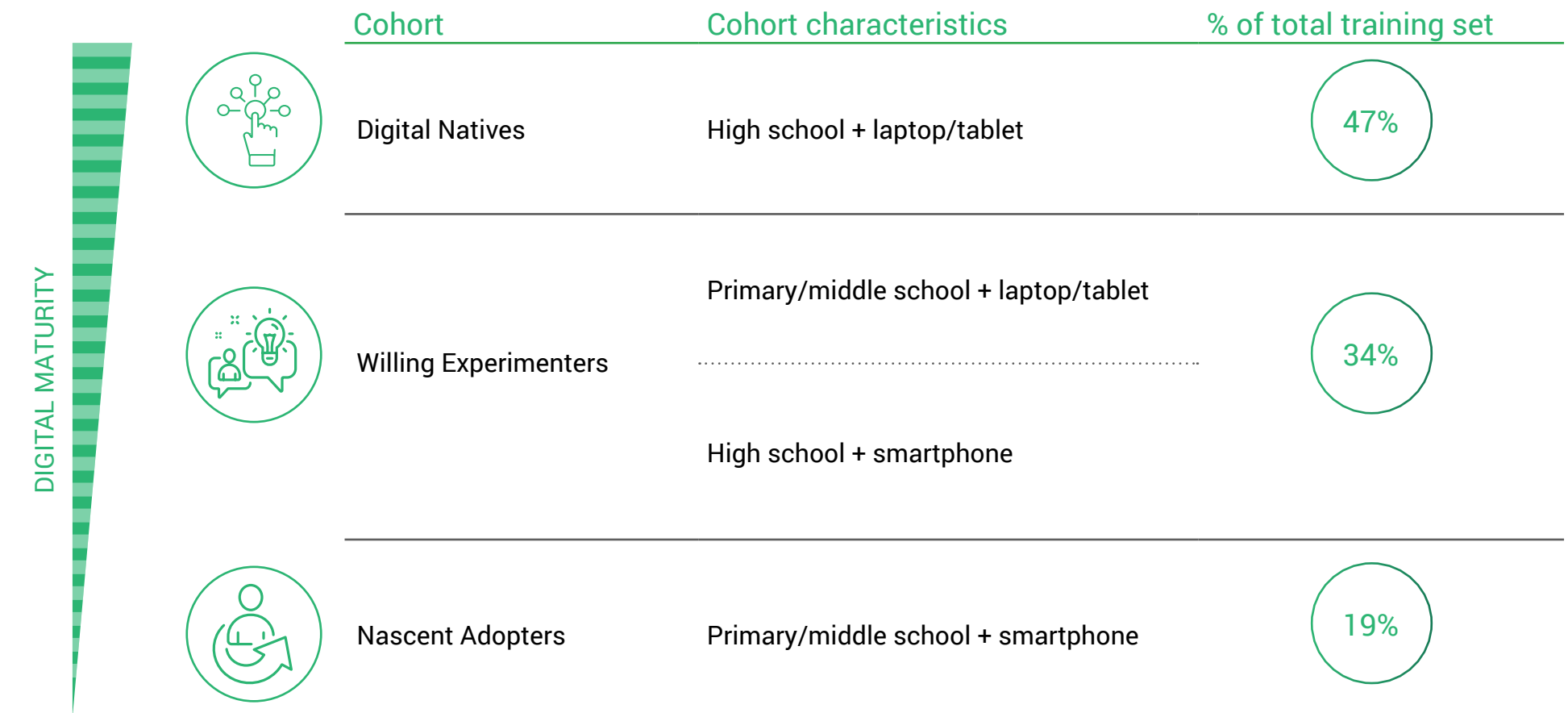
FINDINGS

UNDERSTANDING HOW DIGITAL TOOLS ARE USED IN EDUCATION

Chapter Summary

01 ~55-65% of teachers adopted Google for Education tools for online lesson delivery and assessments

% of survey respondents

66%
Create quizzes, tests, and assignments
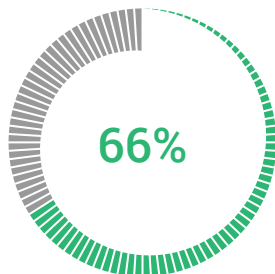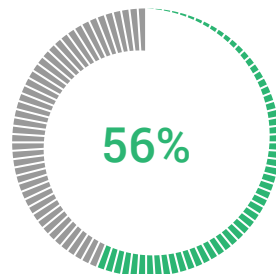
56%
Conduct online classes, record and send lessons

Teachers adopted innovative methods such as screen sharing and MCQ tests

"

I take classes 3 times a week for every section on Google Meet.

I make Google Slides to show important topics with pictures on Google Meet…screen share is the most useful feature of Google Meet.

I teach primary school, and my students are very young. Using Google Forms along with visual-imagery questions was very interesting for the students.

- quotes from teachers in the study

02 ~75% of teachers expect to use Google for Education tools regularly after schools reopen

% of survey respondents
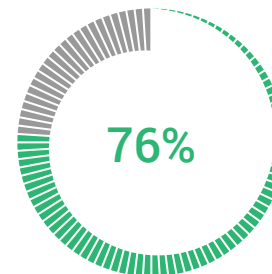
76%
I plan to use these tools regularly
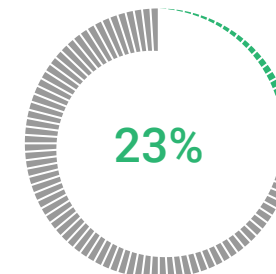
23%
I will only use these tools when other modes of teaching are not available
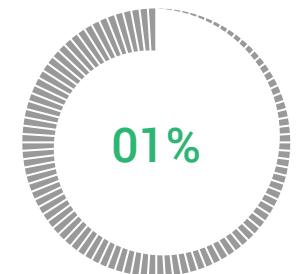
01%
I do not plan to use these tools

Use cases are expected to evolve to include mix of classroom and at-home teaching models

"

I will use Google Meet to record my classes for students who are too far away, or if they are sick and cannot attend class.

I plan to use Google Meet to clear doubts in the evenings or weekends.

I plan to continue using Google Forms to conduct revision tests and post-chapter tests.

- quotes from teachers in the study

Post-training usage | Training enabled teachers to adopt Google for Education tools more regularly, and to use more number of tools

Training enabled teachers to use Google for Education tools more frequently, and to use more tools
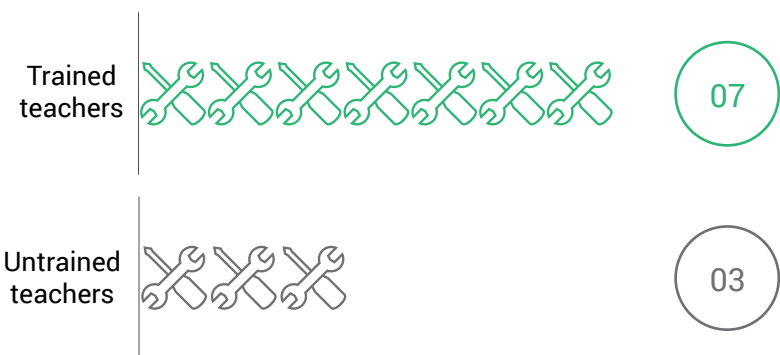
Higher adoption patterns were observed in System 3

Regular usage of Google for Education tools

Trained teachers — **69%**

Untrained teachers — **60%**

Based on open survey sent to System 3 teachers

Regular usage of Google for Education tools

95%
of respondents

# of Google for Education tools adopted by 75% of teachers

Trained teachers — **07**

Untrained teachers — **03**

# of Google for Education tools adopted by 75% of teachers

07
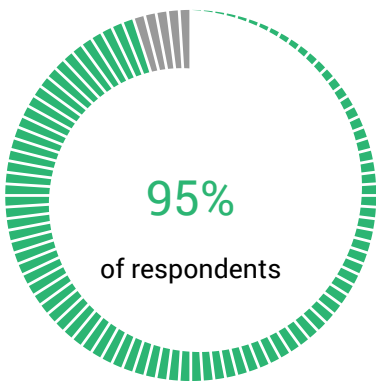
Meet Amit, he is an English teacher who teaches classes 11 and 12

CHALLENGE

Amit was worried about ensuring that his students' education was not interrupted by the COVID-19 pandemic.
"11th and 12th are decisive years for students, so we were worried about how to maintain interaction with them," he said.

SOLUTION

Amit started by sharing YouTube lectures with his students, after which he would arrange a class on Google Meet to clear any doubts that his students might have. "Many students come from poor families and they can't come online regularly. So, we used this semi-online teaching method," he said. After the Google for Education training, Amit learned about the video recording feature on Google Meet, which he has since used to record classes and share with students who cannot attend the lectures.

IMPACT

Through his online classes, he has been able to increase his connect with his students, by holding extra doubt-clearing sessions in the evenings. He has also been able to devote special attention to children who were not generally active in his regular classes. "I have been surprised by how well some students can speak, even those who were very shy before," he said.

WAY FORWARD

Amit plans to continue using Google Meet to connect more with students who cannot afford tuitions, by holding extra classes and doubt-clearing sessions with them during evenings and weekends. He views online learning as a means to extend his relationship with students beyond the school timings and is keen to utilize this connection to support his students' development.

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Use cases | Post training, teachers incorporated Google for Education tools alongside other tools - particularly for online lesson delivery and online assessments

Google for Education tools were primarily adopted for lesson delivery and online assessments

- 55-65% of teachers reported using Google for Education tools to conduct online classes (Google Meet) and quizzes (Google Forms)
- Google Meet and Google Forms were co-adopted along with WhatsApp cascades as the primary communication mode with students – for instance links to Google Meet classes and Google Forms assessments would be sent on WhatsApp

Adoption of Google for Education for administrative activities was lower.

- ~35-40% of teachers adopted Google for Education for maintaining attendance, lesson plan creation, etc.
- Teachers indicated usage of Google Docs for creating question banks and notes, driven by the usefulness of the "voice typing" feature

Google Drive enabled teachers to overcome storage limitations on phones and tablets

- Teachers often had no space on their devices to store the photos received from students everyday (assignments, notes)
- Cloud storage on Google Drive allowed teachers to overcome the limitations of their personal devices and facilitated easy sharing of files and videos with students and colleagues

% of survey respondents

66%	56%	42%	35%
Create quizzes, tests, and assignments	Conduct online classes, record and send lessons	Maintain attendance, record and share test scores	Collaborate with teachers on lesson plans, content creation
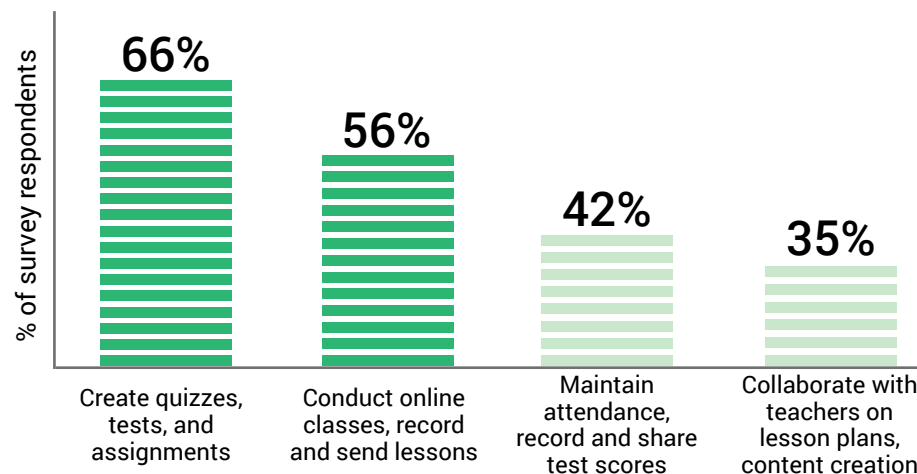
In their own words...

" I send any reading material on the WhatsApp group before the class. After the class, I send notes on the group.

" I take classes 3 times a week for every section on Google Meet.

" Voice typing is the most useful feature of Google Docs. I used it to create more than 30 question banks.

" We get photos from students everyday on WhatsApp. There was not enough space to store it on our phones. Now we can store them on Google Drive.

Meet Sunita, she is a Home Science teacher who teaches classes 11 and 12

CHALLENGE

After the lockdown, Sunita was forced to teach her students online. However, due to a recent syllabus change, she was unable to find any worksheets or notes for her subject online.

SOLUTION

She initially experimented with tools like MS Word and Google Docs to create her own notes. After attending the Google for Education training, Sunita learned about using Google Forms for creating MCQ tests, which she now uses to train students for the new objective component in her subject.

She also learned about using the voice typing feature on Google Docs, which she uses to type out notes and question banks. "It used to take me time to write notes and explain to my students, but now it's so much easier to voice type the notes and share with them," she said.

IMPACT

Sunita has now overcome the issue of not being able to find content online by creating her own worksheets and tests for her students. She also believes that her students are now more comfortable using digital tools. "When my students finish school and go on their professional careers, they will be ready to use technology and will not be scared of new things," she said.

WAY FORWARD

Once schools reopen, Sunita plans to continue using digital tools to create quick revision tests and notes. She believes that using digital tools often will help her students develop professionally and broaden their horizons as they prepare to graduate from school.

Voice-typed notes shared by Sunita

पाठ 21

विकास संचार तथा पत्रकारिता

भूमिका

संचार हमारे सामाजिक एवं व्यावसायिक जीवन का एक अभिन्न अंग है। टेलीविजन, रेडियो तथा समाचार पत्रों में समाचारों के अतिरिक्त अपने स्वास्थ्य, पर्यावरण उपभोग, निर्धनता तथा अन्य विषयों के बारे में अवश्य देखा, सुना पढ़ा होगा।

विकास पत्रकारिता एक सामाजिक गतिविधि है तथा पत्रकार अनेक माध्यमों के द्वारा समुदाय की भावनाओं को समुदाय तक पहुंचाता है। पत्रकारिता का महत्व इसलिए है कि जनता को अपना मत प्रकट करने तथा अभिव्यक्ति का अधिकार मिले किसी भी लोकतांत्रिक व्यवस्था के लिए पत्रकारिता एक अभिन्न अंग है।

मूलभूत संकल्पनाएं:

विकास: विकास का अर्थ है व्यक्तियों के सामाजिक व आर्थिक तथा सांस्कृतिक जीवन में बिना किसी शोषण या हिंसा के सकारात्मक परिवर्तन लाना। यह विभिन्न समस्याओं जैसे कि निरक्षरता, जनसंख्या, कुपोषण, खराब स्वास्थ्य, भूख तथा प्रदूषण से लड़ने में मदद करता है।

विकास पत्रकारिता: यह एक नई संकल्पना है। यह उपनिवेशी युग के समाप्त होने पर आया था। पहले पत्रकारिता संघर्ष, लड़ाई झगड़ा, हत्याएं, युद्ध जैसे मामलों पर ध्यान देती थी जो उपनिवेशी शासक चाहते थे। आजकल विकास पत्रकारिता ऐसे व्यक्तियों की सफलता के समाचार पर ध्यान देती है जिन्होंने नई प्रौद्योगिकी अपनाई है, नई विधियों का परीक्षण किया है और समाज की सहायता की है।

विकास संचार: यह सामाजिक विकास में मददगार है। यह सकारात्मक सामाजिक परिवर्तन लाने के उद्देश्य से प्रक्रियाओं, योजनाओं तथा संचार के सिद्धांतों को क्रमबद्ध तरीके से प्रयोग करने की विधि है। <u>यह शब्द सबसे पहले 1972 में क्यूब्राल ने प्रयोग किया।</u> यह कला और मानवीय संचार का वह विज्ञान है जिसका उपयोग किसी अभावयस्त समाज के विकास को बढ़ाने के लिए योजनाबद्ध तरीके से किया जाता है।

Innovations | Teachers went beyond traditional teaching methods - incorporating screen sharing, read-alongs, and MCQ[1] assessments to engage students better

Teachers used Google Meet to conduct more interesting and interactive lessons
- Using screen sharing to share pictures and videos to illustrate concepts better
- Recording lectures and sharing with students for revision, and for students who could not attend live classes

Students were more interested in solving MCQ-based assessments on Google Forms
- Auto-scoring and pictorial questions elicited faster responses and more interest from students than solving traditional worksheets

Use cases were context specific and their applicability varied based on the classes taught
- Google Meet was more useful for high school teachers to teach online
- Google Forms was more useful for primary and middle school teachers to set short MCQ-style assessments

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Screen sharing, read-alongs on Google Meet were used to engage students better	MCQ-style tests elicited better responses from students	Applicability of use cases is context specific
In their own words...		

" I make Google Slides to show important topics with pictures on Google Meet...screen share is the most useful feature of Google Meet.

I tell my students to open the chapter in the text-book and I read it out to them. **"**

" We get quicker response on Google Forms than the worksheets, students are very interested in doing them.

Students can see the correct answer on Google Forms immediately, so they are more eager to do the assignments. **"**

" I agree that Google Meet is useful for older students, but not for younger students. For young kids, we still give worksheets mainly.

For higher classes, it is difficult for me to send long answer questions on Google Forms. **"**

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1. Multiple Choice Questions

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Meet Gurveen, she is a Social Science teacher who teaches classes 7, 9, and 10

CHALLENGE

In her 25+ years of teaching, Gurveen had rarely attempted to use any digital tools when teaching students. The closure of schools during the pandemic forced her to learn to teach using digital tools.

SOLUTION

After attending the Google for Education training, Gurveen started to take online classes through Google Meet. Going beyond teaching with a blackboard, she adopted many innovative methods, such as sharing presentations filled with pictures or using videos and 3D animations. "To explain about the structure of the earth, I showed them a 3D video. They really liked it and were able to understand easily," she said.

IMPACT

Being able to learn new tools and teach her students interactively at her age has made her more confident and happier. "I have always wanted to learn driving but I never did. Now I feel that if I can learn to use digital tools, I can learn driving also," she said, adding that her students also appreciate her for being able to teach them innovatively.

WAY FORWARD

Gurveen plans to continue using digital tools once schools reopen, especially to teach advanced topics to high performing students beyond her school hours. "As I practice more with these tools, I will be able to find out more features and also use them better to teach my students," she said, as she looked forward to the future.

3D animation used by Gurveen in her lessons

Internal Structure of the Earth
In this module, you will learn about the internal structure of the earth.
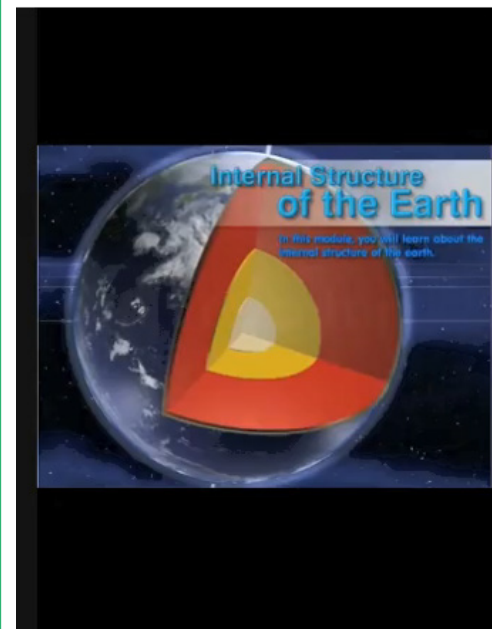
Ongoing usage | ~75% of teachers expect to continue using Google for Education tools after schools reopen especially for revision tests, extra classes, virtual PTMs[1]

Teachers envisioned new and evolved use cases for digital in education

Expand teaching beyond the classroom
By using Google Meet for doubt-clearing sessions and weekend classes, PTMs, etc.

Enable self-learning among students
By conducting short self-assessments and concept checks via Google Forms

Create content and collaborate with colleagues
By using Google Docs to create and share notes, using Google Sheets to store and share student data, etc.

The intention of teachers to continue using Google for Education validates the training model, which enabled teachers to adopt digital for their context-specific use cases and encourages them to broaden the teaching model.

1. Parent Teacher Meetings

% of respondents | **Will use Google for Education regularly in the future** | 76%

| Usage of Google Meet is expected to evolve into new use cases beyond the classroom | Google Forms will be used for short assessments and revision tests | Google Docs and Google Sheets will be used for creating notes and storing data |

In their own words...

I will use Google Meet to record my classes for students who are too far away, or if they are sick and cannot attend class. Many parents are not able to attend PTMs due to their work. We will use Google Meet to conduct PTMs with them.	I plan to continue using Google Forms to conduct revision tests and post-chapter tests. I will send self-assessment tests after every chapter on Google Forms, which students can do from home after class.	I will keep using Google Docs to create notes and PDFs for my subject. I will take attendance on my phone in class and save it in Google Sheets. I can easily share this sheet with other teachers and the school principal.

FINDINGS

UNDERSTANDING THE BENEFITS OF DIGITAL TOOLS IN EDUCATION

Chapter Summary

01 60-75% of teachers reported increased efficiency and ease of teaching as the most prominent benefits
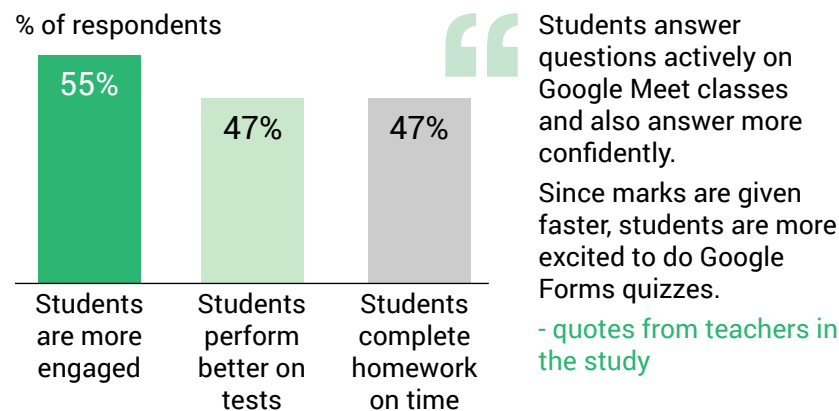
% of respondents

76%	61%	56%
Increased ease of teaching	Increased efficiency	Confidence in remote teaching

"It is easier to clear doubts when I can see students face-to-face.

I don't need to print out anything anymore, saves me a lot of time.

- quotes from teachers in the study
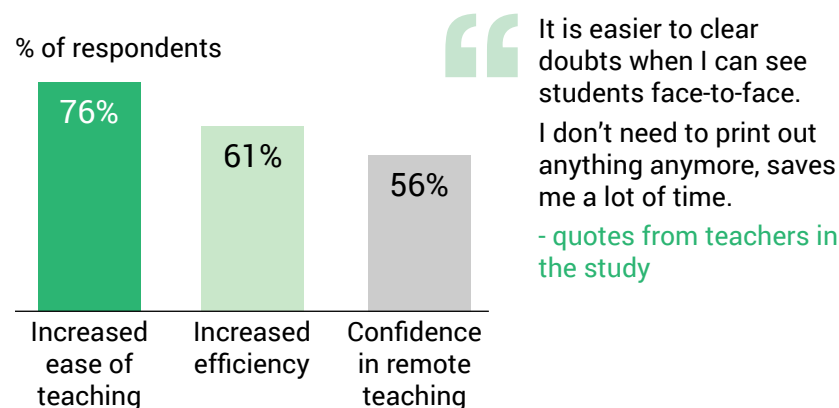
02 ~60-70% of teachers became more comfortable with technology and happier at their work

% of respondents

68%	63%
More comfortable with technology	More happiness at work

"Before, we used to feel that only private school teachers are tech-savvy. Now we feel that we are also equal to them.

Students have taken a lot of interest. Their enthusiasm and curiosity is very high and it is very enjoyable to teach them.

- quotes from teachers in the study

03 ~45-55% of teachers felt that students are more engaged in class, perform better on tests

% of respondents

55%	47%	47%
Students are more engaged	Students perform better on tests	Students complete homework on time

"Students answer questions actively on Google Meet classes and also answer more confidently.

Since marks are given faster, students are more excited to do Google Forms quizzes.

- quotes from teachers in the study

04 60-65% of teachers reported greater engagement with guardians[1], and positive feedback on students' attentiveness

% of respondents

65%	60%
Increased engagement with guardians	Guardians[1] reported better student attentiveness

"Parents are more involved in what their children are learning now.

Students often don't tell their parents about what they are doing at school, but now via these tools we can connect and send details directly to parents.

- quotes from teachers in the study
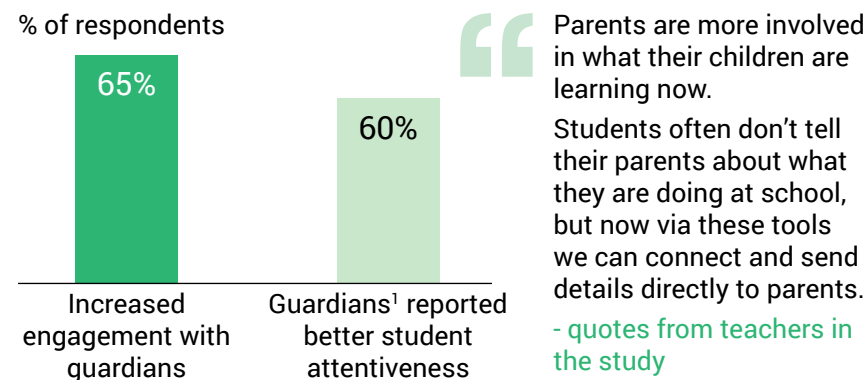
1. Refers to both parents and guardians

Impact | Teachers experience benefits of digital tools beyond remote teaching – especially in increased efficiency and creativity; usage of more tools led to higher perception of benefits

Teachers cited benefits beyond remote teaching, providing encouraging signs for continued usage of digital tools

- 3/4th of survey respondents indicated that features such as voice typing in Google Docs and recording classes on Google Meet for revision made it easier for them to teach their students
- 55-60% of respondents reported increased efficiency in their work and enhanced creativity in content creation, through screen sharing on Google Meet, organizing data on Google Sheets, etc.

Training teachers before they adopt digital tools enables them to extract greater value from digital in education

- More trained teachers (+15-20%) reported benefits than untrained teachers
- Higher perception of benefits is driven by more regular usage of more numbers of Google for Education tools by trained teachers versus untrained teachers
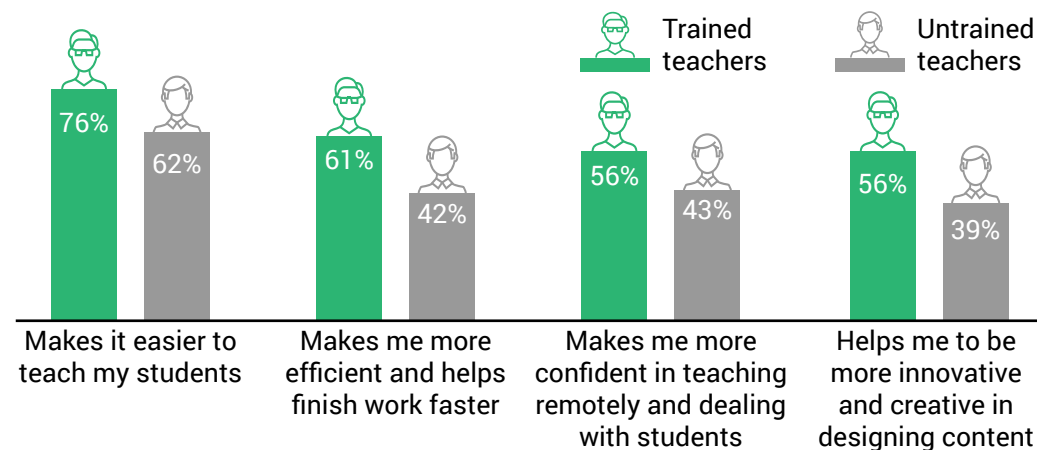
Trained teachers | **Untrained teachers**

	Trained	Untrained
Makes it easier to teach my students	76%	62%
Makes me more efficient and helps finish work faster	61%	42%
Makes me more confident in teaching remotely and dealing with students	56%	43%
Helps me to be more innovative and creative in designing content	56%	39%

Untrained teachers also perceive similar benefits, but at lower levels than trained teachers; likely due to lower adoption and usage of digital tools among untrained teachers

In their own words...

- Revision is now easy for students. Even if they didn't pay attention, they can watch the class video again later and learn.
- I use voice typing with Google Docs, it helps me make question papers faster than by typing.
- When we were teaching in school, it was not easy to share pictures or videos with students. Now using Google tools I can share them easily.
- All my data is in one place, it takes less time to search and find data when the HOD or principal asks for it.

Teachers point to greater comfort with technology, work satisfaction and social validation; socio-emotional benefits increase with usage, especially in rural areas

Teachers experienced socio-emotional benefits, both through personal improvement as well as increased social standing

- 60-70% of respondents reported greater comfort with technology and increased happiness, driven by increased awareness about technology and better connect with students
- 35-45% of teachers also reported greater respect from their community (colleagues, students, guardians), which enhanced their self-esteem and social standing

Socio-emotional benefits are more powerful in rural areas

- More teachers (+10-20%) from System 2 reported socio-emotional benefits, especially relating to increased comfort with technology and social validation
- Higher socio-emotional benefits can motivate teachers from rural areas to serve as evangelists for adoption of digital tools within their larger community

In their own words...

> Our technology knowledge was not that good. I am happy to update myself with the times and it makes me more confident.

> Training helped break the monotony of teaching. One picture is worth a 1000 words and students are more entertained now.

> We have got more respect from our vice-principal also – they ask us about how we conduct quizzes using digital tools and we explain it to them.

% of survey respondents

Trained teachers   Untrained teachers

	Have become more comfortable using technology in day-to-day work	Enjoy my work more and makes me happier with my job	Students/guardians respect me more because I can create a better learning experience	Other teachers respect and compliment me for using these tools well
Trained	68%	63%	47%	36%
Untrained	51%	48%	39%	28%

	System 1	System 2	System 1	System 2	System 1	System 2	System 1	System 2
	62%	76%	65%	60%	42%	53%	27%	47%

1. Refers to both parents and guardians

Meet Praveen, he is a Political Science teacher who teaches classes 11 and 12

CHALLENGE

As a class teacher, Praveen found it difficult to store and share hard copies of students' data with the school administration, such as attendance records, students' contacts and personal data, etc. "Sometimes I would have left the copies in the school, and the principal would ask for the data when I was at home, and I wouldn't be able to share the data then," he said.

SOLUTION

After the training, Praveen began to use Google Sheets to track student attendance and other bio-data, and to collaborate and share files with his colleagues. "I send the master attendance sheet to other subject teachers and they also record the attendance on the sheet and share it with me. I can share this data with the school administration even if I am at home," he said.

IMPACT

Adopting Google for Education tools allowed Praveen to seamlessly store and share data with his colleagues. He has also gained recognition in his school as a digitally adept teacher, and often helps colleagues with their IT queries. "I help them to solve their issues in teaching classes, how to intimate students, how to send them Google Meet links, etc.," he said.

WAY FORWARD

Due to the many benefits that Praveen has experienced from moving his data online, such as easy collaboration and more convenient sharing, he plans to use Google Sheets to store all his data even after schools reopen.

Sample attendance record shared by Praveen

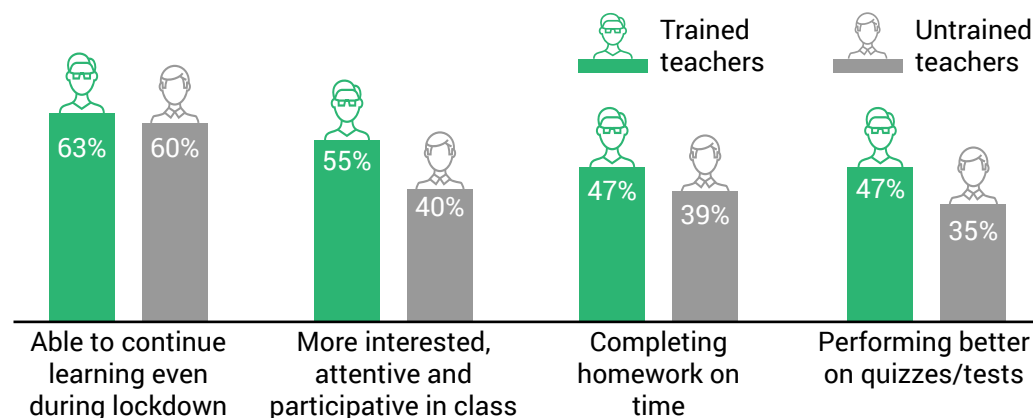The content of this report is owned by Schoolnet.

~45-55% of teachers felt that students are more engaged in class, perform better on tests

○ Teachers reported that students were more proactive in their responses during live Google Meet sessions than when they used to send recorded videos on WhatsApp

○ Younger students were fascinated by the MCQ format of the quizzes on Google Forms, and responded quicker to these assignments than to traditional worksheets

Digital tools allowed students to develop 21st century skills

○ Students developed improved communication and collaboration by creating and sharing their own presentations with the class

○ Increased self-learning contributed to development of critical thinking and creativity, with many students using the internet to clear their own doubts and learn about new topics

Trained teachers   Untrained teachers

	Able to continue learning even during lockdown	More interested, attentive and participative in class	Completing homework on time	Performing better on quizzes/tests
Trained	63%	55%	47%	47%
Untrained	60%	40%	39%	35%

Untrained teachers also perceive similar benefits, but at lower levels than trained teachers; likely due to lower adoption and usage of digital tools among untrained teachers

In their own words...

" Interaction with students is better when we can see them face-to-face on the video call, they respond better.

" Students are fascinated by Google Forms tests because they like the MCQ options. They also get marks immediately, so students are more excited to do Google Forms quizzes.

" My students are clearing their own doubts by using Google Search and Google Lens — for example, to identify what kind of bird or tree is shown in the picture.

" After every class we ask students to speak about what they learned and share with us. We share some of these with the other students so they can learn from their own words.

Parental response | Students' guardians[1] perceived increased interest from their wards and were more engaged with teachers, especially in rural areas

Students' guardians[1] responded positively to adoption of digital
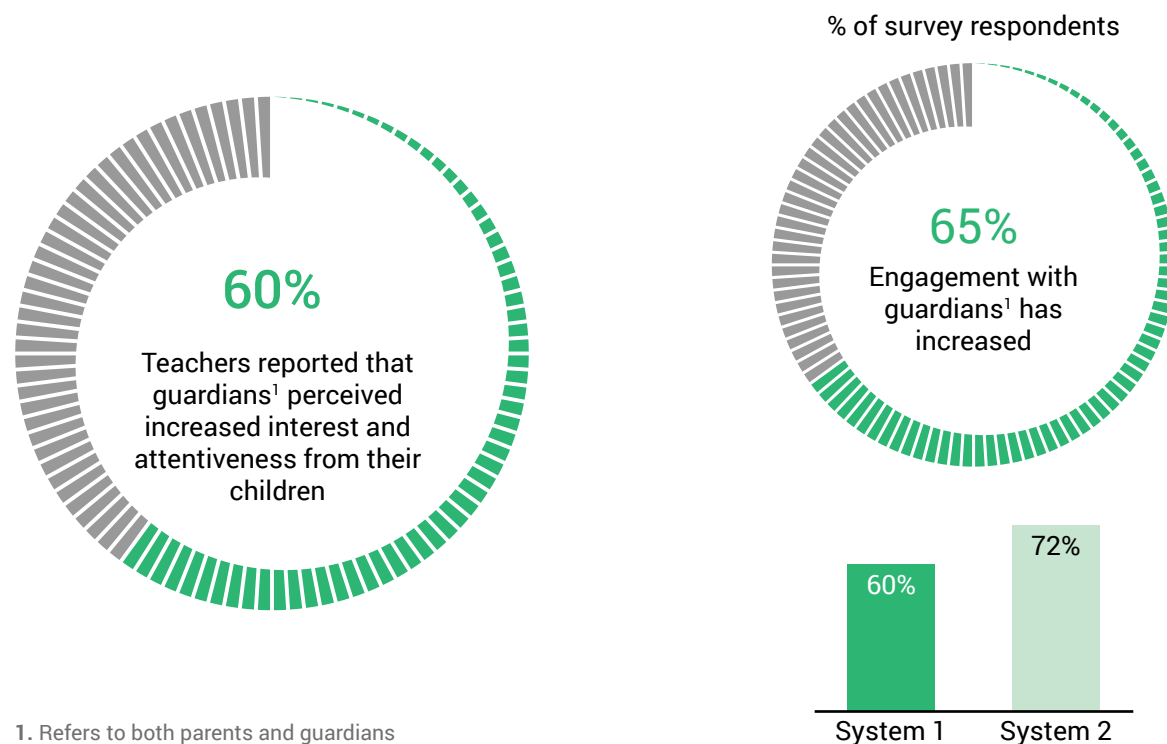60% of teachers reported that guardians[1] perceived higher interest and attention levels from students

Increased interaction between teachers and guardians[1]
Teachers are directly connected to guardians[1] via virtual PTMs and direct phone calls especially in rural areas

Increased involvement in education
Guardians[1] are more involved in their child's education for instance, sitting along during online classes and following up with teachers regarding assignments

60%
Teachers reported that guardians[1] perceived increased interest and attentiveness from their children

% of survey respondents

65%
Engagement with guardians[1] has increased

60% — System 1
72% — System 2

In their own words...

> Before we used to only talk to parents during PTA meetings, now we regularly talk on WhatsApp or phone.

> We have held PTMs on Google Meet with parents in my school.

> If we don't send videos everyday, parents immediately call and check.

> Some parents sit with their kids in the online classes also.

1. Refers to both parents and guardians

Meet Sunil, a teacher who teaches all subjects to students in class 6

CHALLENGE

Sunil was already familiar with using digital tools such as Microsoft PowerPoint in his classes, but even he was challenged by going completely digital when schools closed down.

SOLUTION

When schools closed down, he expanded the set of activities that he used digital tools for. He started conducting online tests on Google Forms and also started creating notes and worksheets on Google Docs by using voice typing. His interaction with colleagues also became digital, through online feedback sessions and administration meetings on Google Meet, collecting students' data using Google Forms and then sharing with each other through Google Sheets.

IMPACT

Sunil feels that a new and exciting teaching atmosphere has been created by using Google for Education tools, and he has also seen his students open up more. "My connection with the students has increased a lot. They are less hesitant to clear their doubts and are not scared of teachers anymore," he said. He has also trained his colleagues to adopt digital tools and has gained their respect. "My self-development is quite good now. My colleagues also appreciate me a lot and I feel very happy about that," he said.

WAY FORWARD

Motivated by the response and interest shown by his students, he plans to use the digital facilities in his school (such as projectors and computers) more comprehensively once schools reopen, and intends to incorporate more digital tools in his teaching activities.

Sample notes shared by Sunil

Directions

North
North-West
North-East
West
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South
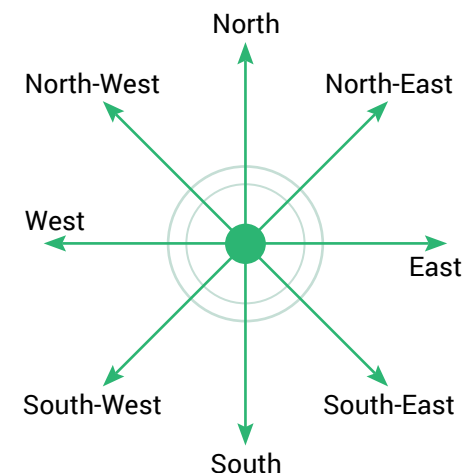
CASE STUDY :
KENDRIYA VIDYALAYA (KV)

KV program rollout | Cascaded train-the-trainer model was adopted along with best practices in decentralized training, post-training support and stakeholder education efforts

Google for Education partnered with KVs in Delhi, Madhya Pradesh and Assam to facilitate digital transformation in education

03
Regions

161
Schools

6.6k
Teachers
28k+ teachers
across all KV regions

215k
Students

A comprehensive train-the-trainer model was adopted for decentralized implementation by KV schools

600 trainers trained directly by Google for Education, 28k+ teachers trained through cascaded trainings

2 hour trainings spread out over 1-2 days each, followed by 1 refresher training and doubt-clearing session

Trainings were focused on hands-on, application-based learnings for practical use cases

Complete ownership of implementation by zonal authorities, and monitoring of adoption via analytics dashboards

KV schools adopted best practices in training, post-training support to drive adoption of Google for Education tools

Best practices adopted in training
- YouTube tutorials and instruction manuals to guide teachers
- Follow-up refresher training sessions to provide practice
- Subject-wise master trainers to motivate teachers
- Experience sharing and demonstration classes by teachers

Post-training support to increase adoption
- Provision of internet facilities and 24x7 tech support
- Training teachers to use 3rd party Android apps along with Google for Education tools
- Dedicated email and WhatsApp support to resolve queries
- Regular monitoring and motivation by school-level authorities

Schools undertook efforts to educate students, guardians[1] on digital learning, thereby 'priming' the system for success

School-level support and community engagement
Meetings to increase awareness among guardians[1], technical support, and demonstrations by teachers through live sessions

Informational videos and support resources
Tutorials and how-to-use resources created by teachers on installation, login, and usage of Google for Education for school work

1. Refers to both parents and guardians

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Adoption and use cases | Best practices in rollout drove ~95% adoption and innovative use cases such as real-time evaluation, blended learning models, and remedial classes

Administration mandates, best practices in training, post-training support led to high adoption in KVs

95%

Used Google for Education tools regularly

Conducted online classes
94%

Conducted online quizzes
80%
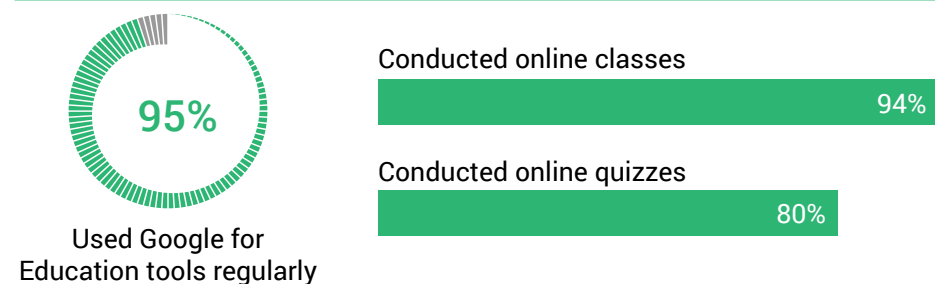
Assessments, competitions, and interactive video sessions used to expand use of digital in education

- Interactive teaching through live and recorded video lessons, screen sharing and live demonstration of experiments

- Real-time evaluation of students during online lectures, using objective MCQ-type assessments and formal tests

- Integration of 3rd party Android and Google Chrome apps such as Kami, GoFormative, etc. to conduct and evaluate tests

- Conducting virtual academic competitions, co-curricular activities and cultural fests

- Engaging students and guardians[1] beyond the classroom through virtual PTMs and morning assemblies

Blended learning approaches adopted by schools point to continued adoption of digital in the future

Hybrid (online + offline) classes

- Teachers deliver lectures using smart classrooms both to students in class and at home
- Students attend lectures at home and come to school for practical exams

" 75% students are still at home, smart classrooms being used to manage online and offline classes, 2-3 such classes in each school.

– quote from a KV school teacher

Extending learning beyond the classroom

- Teachers use Google for Education tools to conduct remedial classes and doubt-clearing sessions after school hours
- Regular class hours are used for teaching and online assignments and projects are handed out after class

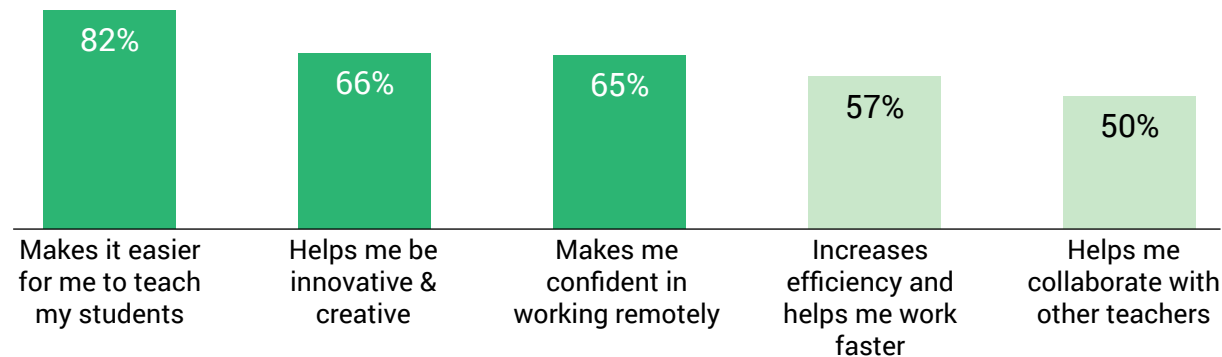" Planning of lessons, homework, assignments, projects and assessments are still going on using Google tools. The school timing is being utilised for core teaching.

– quote from a KV school teacher

1. Refers to both parents and guardians

Benefits and impact | Teachers point to benefits beyond remote teaching such as ease of teaching, creativity; students show improved performance, engagement

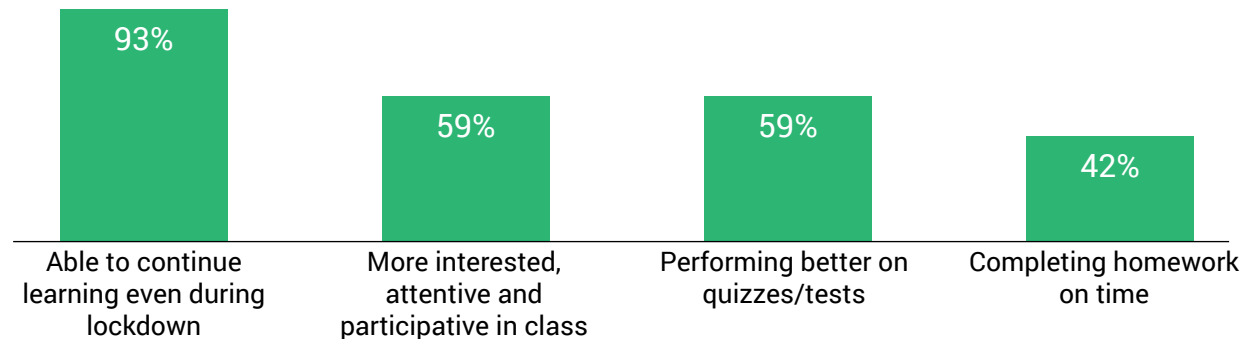## Benefits from use of Google for Education tools by teachers

% of respondents

82%	66%	65%	57%	50%
Makes it easier for me to teach my students	Helps me be innovative & creative	Makes me confident in working remotely	Increases efficiency and helps me work faster	Helps me collaborate with other teachers

Impact on student learning from use of Google for Education tools

% of respondents

93%	59%	59%	42%
Able to continue learning even during lockdown	More interested, attentive and participative in class	Performing better on quizzes/tests	Completing homework on time

Benefits for teachers were enabled by interoperability and collaboration features in the product suite

In their own words...

" School in-charges can view every task undertaken by teachers and their students making supervision easy.

" Overall. students benefited and all work i.e assignments, question paper, their submission everything was at one place

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ENABLERS AND BARRIERS TO GREATER ADOPTION OF DIGITAL TOOLS

Enablers | Teachers cite better device access, relevant and organized content, greater parental awareness, and more opportunities to practice as key enablers to adoption

Broadening access to digital devices

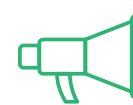~75% of teachers cited the need for better internet access and digital devices such as projectors, WiFi, etc.

Enable access to content

~60% of teachers reported the need for more organized content and more content in underserved subjects

Creating user communities, support networks

~40% of teachers cited need for additional support after training
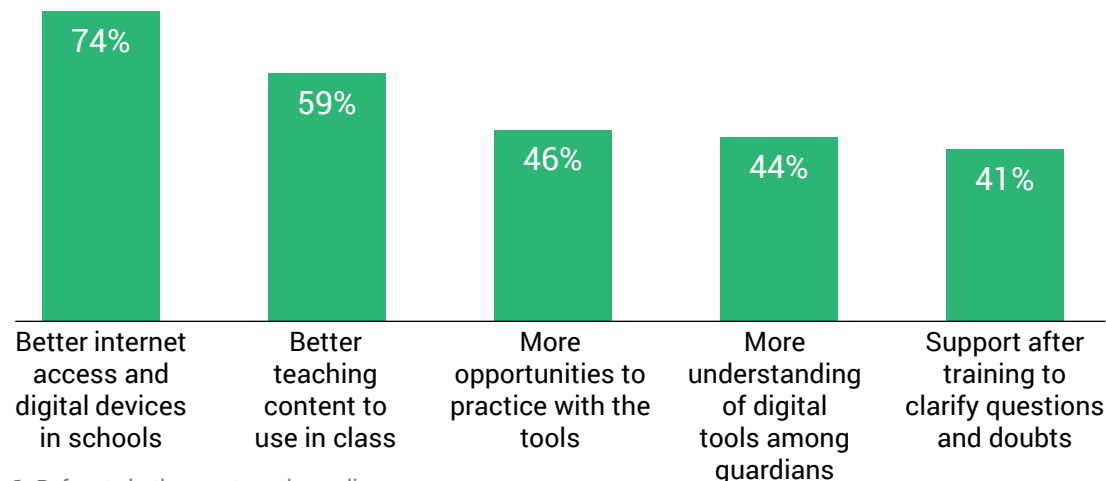
Creating awareness amongst guardians[1]

~45% of teachers reported the need to make guardians aware about the usage and importance of digital tools in education

Expanding training and practice opportunities

~40-45% of teachers cited the need for detailed training sessions and post-training support to clarify their queries

% of respondents

74%	59%	46%	44%	41%
Better internet access and digital devices in schools	Better teaching content to use in class	More opportunities to practice with the tools	More understanding of digital tools among guardians	Support after training to clarify questions and doubts

1. Refers to both parents and guardians

In their own words...

" If we could have more digital classrooms with computers and projectors, we can create presentations and share with students.

" There are so many videos online, students and teachers don't know which video is relevant to them.

" I want more hands-on training. I want to learn to use more tools like Google Classroom regularly which I'm not able to do now.

" Even if teachers are trained, until parents and students also know how to use these apps it will be difficult to use them regularly.

Innovating around barriers | Teachers addressed challenges in access and awareness via innovative solutions; however, long-term sustainable solutions are required

Lack of device and internet access are major challenges in digital adoption…

- Teachers reported attendance rates lower than 30% in online classes, primarily due to students not having access to smartphones
- Most children rely on their Guardians[1]' phones, and do not have access to phones when they are away at work
- Commonly seen in households with multiple children, where students can only attend online class at a particular time

..However, teachers' innovative solutions have shown that these hurdles are not insurmountable

- By circulating a separate "Google Meet timetable" in which classes are held before guardians[1] leave for work or after they return from work
- Recording and sending videos of their live classes
- Coordinating and assembling a group of students in a house with internet and smartphone access
- Training sessions for guardians[1] to make them aware of digital tools in education and on how to moderate their child's activity on smartphones

Lack of devices and internet results in low attendance	Teachers found creative solutions to problems of device access
In their own words...	
" Out of 70 students, a maximum of 20-25 connect on Google Meet. When there are many children in the house, parents run out of data and students cannot attend classes. "	" I record my classes on Google Meet and share the videos with students so they can watch them after their parents come home. I created a group where students were told to visit their friends who have smartphones, smart TVs where they can see YouTube videos. "

Nevertheless, while teachers' out-of-the-box thinking has helped in the short term, long-term structural changes are required to ensure that adoption of digital in education is sustainable and scalable inclusively.

1. Refers to both parents and guardians

Meet Mahesh, he is an English teacher who teaches classes 6, 7, and 8

CHALLENGE

Many of Mahesh's students did not have smartphones and their guardians[1] weren't aware of digital tools either. "In rural areas, many parents are not tech-savvy. They don't know about information on the net and YouTube videos on learning," he said, when asked about some difficulties he faced.

SOLUTION

Mahesh took it upon himself to motivate guardians[1] and to encourage his students to attend online classes. "During Diwali, I invited an external speaker who spoke to them about online learning. This encouraged more guardians[1] to move online, and many of them bought smartphones specifically for studies," he said.

IMPACT

Mahesh's efforts helped his students and their guardians[1] to adopt digital tools more easily and ensured that his students could continue learning when schools were closed. He has also noticed that both he and his colleagues are much more confident about using technology now. "I can take a webinar now on any topic, be it my subject or other general topics. This was never thinkable for me before," he said.

WAY FORWARD

Once schools reopen, Mahesh hopes that his school can be provided with computers and projectors, so that he can continue to create and share his content with students in the classroom just like he does online. Having seen first hand the benefits of making guardians[1] aware about digital tools, he also hopes that guardians[1] can be provided with more information about digital tools that will help their children to learn better.

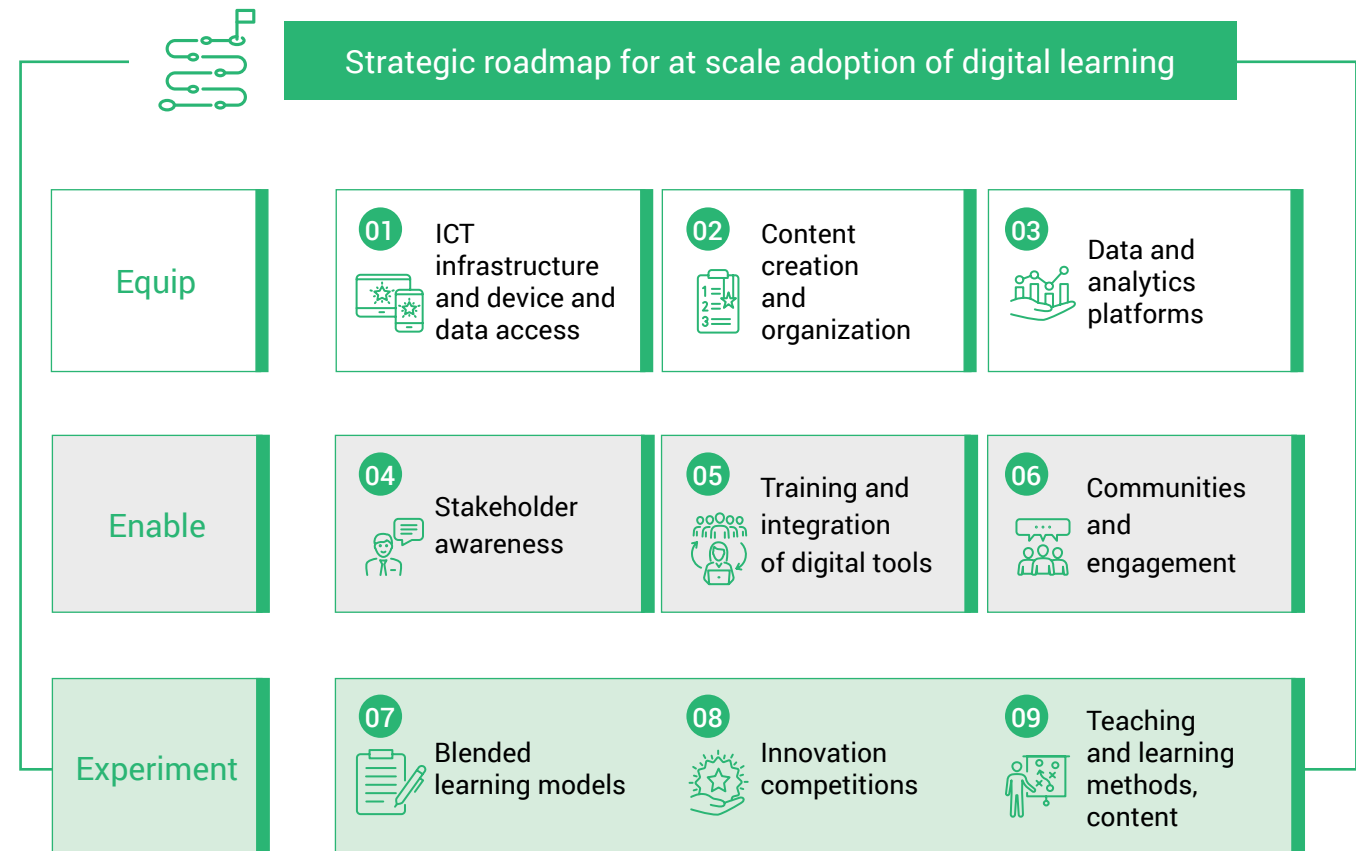**1.** Refers to both parents and guardians

PATH FORWARD FOR AT SCALE ADOPTION OF DIGITAL IN EDUCATION

At scale adoption of digital in education requires stakeholders to Equip-Enable-Experiment in the education ecosystem, driven by a comprehensive strategic vision
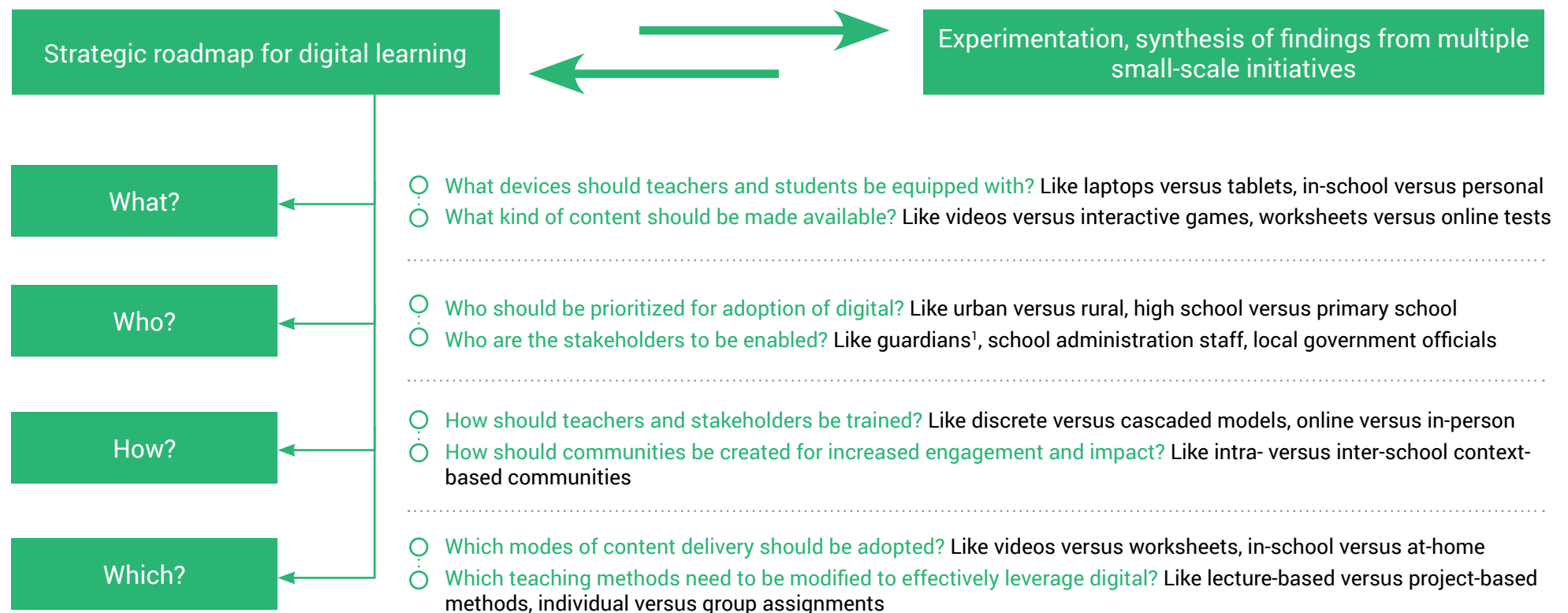
Understanding the learnings of this study across multiple contexts, a set of recommendations have been developed to articulate a potential path forward to drive at scale adoption of digital in education:

Equip
teachers, students, and schools with the infrastructural capabilities to adopt digital in education

Enable
the wider ecosystem through training and engagement

Experiment
with various learning models and teaching methods to develop optimal digital learning models

In addition, it is important to recognize the need for all 3 levers to be activated in a systematic, coordinated manner across the education landscape. These 3 levers will be encompassed by key elements of a strategic roadmap for at scale adoption of digital in education, as presented alongside.

Strategic roadmap for at scale adoption of digital learning

Equip

01 ICT infrastructure and device and data access

02 Content creation and organization

03 Data and analytics platforms

Enable

04 Stakeholder awareness

05 Training and integration of digital tools

06 Communities and engagement

Experiment

07 Blended learning models

08 Innovation competitions

09 Teaching and learning methods, content

Strategic vision | Coordinated, experimentation-driven strategic vision is needed to facilitate effective at scale adoption of digital in education

Strategic roadmap for digital learning ⟷ **Experimentation, synthesis of findings from multiple small-scale initiatives**

What?
- What devices should teachers and students be equipped with? Like laptops versus tablets, in-school versus personal
- What kind of content should be made available? Like videos versus interactive games, worksheets versus online tests

Who?
- Who should be prioritized for adoption of digital? Like urban versus rural, high school versus primary school
- Who are the stakeholders to be enabled? Like guardians[1], school administration staff, local government officials

How?
- How should teachers and stakeholders be trained? Like discrete versus cascaded models, online versus in-person
- How should communities be created for increased engagement and impact? Like intra- versus inter-school context-based communities

Which?
- Which modes of content delivery should be adopted? Like videos versus worksheets, in-school versus at-home
- Which teaching methods need to be modified to effectively leverage digital? Like lecture-based versus project-based methods, individual versus group assignments

By conducting centrally coordinated experiments with buy-ins from various levels of the education leadership, policymakers should create a roadmap to address the What, Who, How, and Which that have been articulated above.

The answers to the above questions will vary with both time and context. The strategic roadmap will need to be evolved through continuous experimentation and iteration to meet the changing demands across India's education landscape.

1. Refers to both parents and guardians

Equip

Rationale

ICT infrastructure and device and data access

44% of public school students do not have access to internet-enabled devices at home[1], preventing them from accessing online learning.

Teachers[4] who owned laptops or tablets used digital tools 10% more often than teachers who only owned smartphones.

Content creation and organization

~60% of teachers[4] cite access to content as a key enabler for digital adoption.

NEP also calls for creation and dissemination of digital content repositories across multiple modes of content and languages.

Data and analytics platforms

KV system study[4] points to increased adoption rates with close monitoring of digital tool adoption and usage.

Malaysia's DELIMa program highlights value of equipping administrations with analytics platforms and data-driven insights

Path Ahead

○ Invest to improve in-school ICT infrastructure, with projectors, WiFi, etc.: E.g. KITE[2] program to deploy ICT equipment and broadband internet in schools

○ Equip teachers and students with gadgets, either in-school or at-home: E.g. Delhi govt equipped teachers in 1.1k+ public schools with 60k+ tablets

○ Enable data access for teachers and students: E.g. Tamil Nadu government initiative to provide 2GB data daily to 900k+ college students

○ Review and organize existing content across multiple sources: For instance, identify and compile relevant content across YouTube, Diksha, etc.

○ Curate modularized, competency-based packages across modes of content: like, "Basic Trigonometry Package", "Introduction to Micro-economics"

○ Create new content in low-coverage subjects and languages by commissioning content creators: Like notes and videos for Home Science, question banks and PDFs in Oriya

○ Provide analytics dashboards to state education departments and schools to enable data-driven decision making: For instance, Kerala's integrated digital ecosystem includes a real-time monitoring system linked to the online learning management system

○ Provide trainings to school- and district-level authorities to interpret data and execute program refinements

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1. ASER (Annual Status of Education Report), 2020, Wave 1. **2.** Kerala Infrastructure and Technology for Education. **3.** B S Anilkumar. 2020. ' What Kerala did that that others could not", Times of India.; **4.** Refers to learnings from this BCG-Google for Education study

Enable

Rationale

Stakeholder awareness

~45% of teachers[3] cite increased parental awareness about digital tools as a key enabler, especially for younger students.

European report[1] also emphasized support of guardians[4] as a key enabler for successful implementation of digital in education.

Training and integration of digital tools

Trained teachers[3] used digital tools more often, perceived more benefits and reported greater positive impact on students.

NEP emphasizes the need for "suitable training and development" to equip teachers to effectively adopt digital learning models.

Communities and engagement

~40-45% of teachers[3] cite the need for more practice post training and support to clear queries as a key enabler.

PISA[2] also highlights collaboration, knowledge sharing as a key metric to measuring ICT use and success

Path Ahead

- Drive awareness among guardians[4] about usage of digital tools for education, through grassroot-level awareness campaigns
- Teach guardians[4] about ensuring safe internet usage by children through TV and radio campaigns

- Conduct trainings at multiple levels within schools to enable end-to-end adoption of digital across the school system
- Build capacity through cascaded train-the-trainer models, by training IT teachers to act as master trainers for their respective schools
- Provide tailored trainings based on context, like focused usage of Google Forms for rural primary schools versus Google Meet for urban high schools
- Train teachers to integrate digital tools with already familiar tools, such as Diksha, WhatsApp, etc.

- Increase post-training engagement through multiple touchpoints such as assignments, practice videos, etc.
- Create self-learning portals for teachers to learn and practice using digital tools like Kerala's KOOL (KITE's Open Online Learning) portal to impart ICT training to teachers
- Create communities of teachers, master trainers, and administrators from similar contexts to facilitate experience sharing and broadening of use cases

Experiment

Blended learning models

Rationale

Experts view the correct mix of offline and online learning as key to effective adoption of digital in education.

NEP also calls for pilot studies in digital education to identify effective models of blended learning.

Path Ahead

○ **Drive large-scale experiments of blended learning models** to identify best-in-class approaches to digital learning

○ **Test the efficacy and impact of models across multiple contexts.** Like in-class lesson delivery versus video lectures viewed at-home, synchronous group instruction versus self-assessment based asynchronous learning

Teaching/ Learning methods and content

Rationale

Traditional teaching methods and content predominantly oriented towards classroom learning.

PISA also refers[2] the need for adapting teaching methods for digital and blended learning models

Path Ahead

○ **Evaluate existing content, teaching practices, and learning models** for applicability to digital learning

○ **Modify content and teaching methods to leverage use cases feasible with digital in education.** Like the use of lectures versus digital content for instruction, project-based learning especially for topics like coding, leveraging real-time assessment to course-correct lesson planning

Innovation competitions

Rationale

Innovative solutions were devised[3] locally by teachers, schools to counter issues of student awareness and access to digital

European report[1] also recommends incentivizing teachers' use of ICT via competitions, prizes, financial incentives, etc.

Path Ahead

○ **Conduct competitions in partnership with third-parties and NGOs** to drive adoption of tools for teaching, content creation, collaboration, etc

○ **Incentivize teachers and schools** with awards such as "Star Teacher Award" or "Digital School Award"

1. 2nd Survey of Schools: ICT in Education, 2019, European Commission; **2.** ICT-specific learning material and teaching methods have included in the PISA 2021 ICT Framework; **3.** Refers to learnings from this BCG-Google for Education study

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