

**Securing the Upside:
Pandemic Teaching and Learning Success Themes and Go-Forward Policy**

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Abstract

This article explores themes of teaching and learning innovations that emerged or were reinforced during the pandemic. Some innovations have survived, and even thrived, and the authors believe they have a role post-pandemic. The authors explore these themes and recommend policy steps that can secure future benefits from this unwelcome but still hard-won experience. The themes emerged from discussion between a U.S. STEM researcher and five Indian education professionals whose backgrounds cover private schools, public schools, educational technology, science and technology informal learning, and policy. The themes are: improved access to teachers, improved access to content, and acceleration of supporting pedagogies. Various lenses are applied: technology, process creativity, real-world learning, self-efficacy and social-emotional learning, and the perspective of teachers. A lens of special note is the digital divide and ways innovations differed in their usefulness between those with resources and those without. A summary is provided of the student learning that has occurred despite the pandemic, or because of it—learning that is often hard to measure. Overall, teaching and learning have suffered greatly. Where gains have been made, the authors' greatest hope is to help secure them long-term.

Keywords: Teaching; Learning; Innovation; Pedagogy; Pandemic; Policy

Introduction

Teaching and learning have suffered greatly during the pandemic. During this time, over 1.2 billion children were out of classrooms in 186 countries in the world, and

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over 320 million students faced severe learning challenges (Li & Lalani, 2020). In India, 250 million students are of K-12 age (Powell, 2021).

Teachers have borne the brunt of the pandemic teaching challenge. Many have worked longer hours, with some being available constantly both during and outside formal hours. Many have done so on reduced salaries or faced furloughs (if they did not lose their job outright) (Bose, 2021). Some had to purchase their own devices to continue teaching. Meanwhile, teachers innovated, both individually and collectively. They did so in an environment that changed overnight and with little or no training for new demands. They dealt with imperfect technology, lack of student physical connection, reduced student engagement, and increased parental intervention. Teachers' challenges have been large.

Ultimately though, this paper is not about the massive challenges faced by students and teachers in India, South Asia, the U.S., or worldwide. The context described is important, but the challenges are well documented elsewhere. Rather, it is a search for themes of innovation that emerged or have been reinforced during the pandemic. Bell (2021) reports that 'many schools are already evaluating what things worked and how to maintain them when the pandemic eventually ends' (In-class learning isn't best, para. 1). The authors have sought innovations that survived, at some level thrived, and deserve to be sustained. These innovations and the ideas they represent are too hard-won to be let go.

The research paradigm used is *critical theory* (Guba & Lincoln, 1994), a theoretically based approach that allows for participant researchers who both observe the system and are within it. The list of authors includes a U.S. STEM researcher and five Indian professionals whose backgrounds cover private schools, public schools, educational technology, science and technology informal learning, and policy. The authors started with the overarching question 'what teaching and learning developments should survive the pandemic?' and progressed through iterations of live and asynchronous discussions. The final article reflects the themes that emerged, and it reflects the lenses the authors found themselves applying. The themes and lenses rise beyond anecdotal evidence and show themselves true at some scale in India, South Asia, the U.S., or global settings.

Three themes emerged. First, some innovations provide improved access to teachers. Second, some innovations provide improved access to content. Third, some innovations accelerated use of 21st century pedagogies, especially those emphasizing real-world learning and learning in context.

The three themes focus on outcomes. The outcomes we observed were all were reached through various tools and techniques of the teaching trade, which the authors used as lenses for observation. For example, technology has played an essential role in enabling access. Other lenses are process creativity, real-world learning, self-efficacy and social-emotional learning, and the perspective of teachers.

A lens of special note is the digital divide. Some innovations mostly benefited people with resources. People lacking resources struggled more. Still, they

occasionally found their own ways to achieve some level of benefits. Table 1 summarizes the themes and lens of observation.

Table 1. Themes of at-scale pandemic innovations; lenses of observation

Themes	Lenses of Observation
Improved access to teachers	Technology
Improved access to content	Process creativity
Acceleration of 21 st century pedagogies	Self-efficacy and social-emotional learning
	Perspective of teachers
	The digital divide
	Hard-to-measure student learning

A powerful way to understand impact is to explore student learning. While the authors acknowledge that student learning commonly measured has suffered, the authors argue that hard-to-measure learning benefited in a myriad of ways.

What is the fate of these innovations? The pandemic has caused negative disruption at massive scale. Meanwhile, smaller disruptions for individual students, teachers, schools, and regions have always been a reality. There is use for these innovations post-pandemic, and new concepts of operation that can integrate their use. In fact, innovations in teaching and learning have never been about the innovations per se, but about their integration into school systems that benefit students, parents, teachers and administrators (Mishra & Koehler, 2006; Ganimian et al., 2020). Many innovations have received an unplanned injection of energy. The authors recommend policy steps to help secure these hard-won learnings.

Innovation Theme: Access to Teachers

The role of teachers in education is both obvious and well researched (e.g., Cuban, 2001). Teachers are professionals at developing students from their current level of knowledge to new levels. Teachers understand the challenges students face and how to help students address them. Those challenges are intellectual in nature, and also social, emotional, and grounded in their lives outside the school day.

Reconnecting teachers to students has been a major priority. Both technology and creativity have been abundant, even if the results represent an incomplete replacement. Necessarily, some of these innovations also connect students to content, a topic covered in the next section.

Technology solutions

Stating the obvious, technology has been fundamental to addressing pandemic challenges. Developments in ICT have made this application of technology possible.

Live video

In settings with resources, live video—most often Zoom (Joia & Lorenzo, 2021)—has been prevalent. Classes are conducted live; many if not most students are live on

video, and with the ability to share screens. Tools like polling can inspire engagement. Live chat complements the experience and gives students of different personalities and aptitudes another way to communicate. Some classes are online only, and others in a live-hybrid format (a format many teachers have found difficult, like having two different jobs (Mason, 2020; Ferlazzo, 2021)).

WhatsApp and other text-based solutions

While WhatsApp can support video, its prevalent use is for messaging. It is prevalent for group messaging, given the easy/free access on smartphones, used for text, image, and file-based conversations, and also for content distribution. In India, WhatsApp was used in 75% of government schools and 57% of private schools (Vyas, 2020).

Learning management systems (LMSs)

Learning Management Systems play a special role in organization of content, and they provide an asynchronous means for teacher-student communication through messaging, especially through discussion boards.

The basics: email and text

One must not overlook these basic methods of connection. The authors know from experience that many teachers simply email students and parents or use built-in phone messaging. It would be fascinating to research what percentage of contacts between teachers and students/parents used these methods.

Non-ICT Innovation

In other cases, access to teachers has been about process creativity—finding non-ICT ways for teachers to connect. In Chhattisgarh in Central India, where infections were relatively low in the first wave, educators started Mohalla (neighborhood) classes. Teachers spent two hours in a room with students. In Dumarthar, a remote tribal village in Jharkhand, whole village walls were converted into blackboards for teaching (Vyas, 2020).

Teachers go mobile

In other cases, teachers very intentionally went to students. The idea is not new. School on Wheels is a 28-year program in California, USA, serving 50,000 students and focusing on high-needs communities (School on Wheels, 2021). A program of the same name was started in India to address pandemic challenges. Teachers travel in a mobile school with material and assignments. Students are instructed and parents

receive guidance. Assignments are checked in further visits. The program serves students from Kindergarten to 5th grade (Asheesh, 2020).

Innovation Theme: Access to the Right Content

Access to content is a distinct theme. Numerous methods have been used to deliver content. Many methods use the same approaches connecting teachers to students: video sessions, WhatsApp, Google Classroom, LMS platforms, and email and smartphone messaging.

Recorded videos

Recorded videos have been highly used. They fall into different categories, including videos from the Internet (e.g., YouTube), recordings specifically made by teachers for their students (Rasmitadila et al., 2020; Bond, 2020); and recording of class sessions. Recorded videos offer advantages previously documented: playing and replaying on demand; accessing content whenever needed (for example, when studying for exams); and viewing independent of specific times and geography (Malhotra, 2021).

Large scale/government portals

Some governments and agencies have launched large-scale digital platforms. An example is Diksha, launched by the Indian government in 2017 (Sharma, 2021). The platform has been a focus of effort during the pandemic, accessed by both teachers and students. In addition to lessons, worksheets, videos and more, there is material about 'mental well-being and inclusive classrooms' (High Quality Learning Material, para. 2). The government reports an average of three crore (30,000,000) hits per day since March 2020.

Process innovation

Educators have found ways to deliver content using old technologies, or no technology at all, especially in locations lacking ICT. In Ethiopia, Save the Children created the Camel Library. They reached 22,000 children in 33 villages with 21 camels carrying up to 200 storybooks in wooden boxes (Railway Children India, 2020).

In very different settings, the U.S. and Ethiopia, initiatives are using television and radio. In the U.S., programs are broadcasting teacher-generated educational content, including in the states of New Jersey, Nebraska, and New Mexico (Catalini, 2020). In Ethiopia, Save the Children secured nine satellite television channels that reach 8 million children with materials developed by regional bureaus and the national Education Ministry (Sewunet, 2020).

Again, one must not overlook basic solutions. In Daman and Diu, India, a campaign delivered worksheets to parents using basic methods of distribution; for example, administrators delivering content to students' homes (Department of School Education, 2020).

Making Choices: The Right Content

Amid tectonic shifts, educators had to choose which content to keep and which to omit—an immediate problem, but a long-term opportunity. Debates about breadth versus depth in education—about content ‘a mile wide and an inch deep’—are longstanding (Schmidt, McKnight, & Raizen, 2007, para. 2). Choices made under duress by teachers represent an opportunity to ‘selectively focus on fewer lessons in more depth...a model for when school campuses reopen’ (Fensterwald, 2021, para. 4) and was welcomed by some teachers.

Innovation Theme: Acceleration of 21st Century Pedagogies

The challenge of pandemic teaching has, at times and by necessity, led to pedagogies consistent with the teaching of technology and 21st century skills.

Technology integration

It is beyond obvious that the pandemic has driven technology's use in learning. Comments from teachers indicate: (1) much learning about remote teaching tools, by teachers and students; (2) an injection of energy in regions lagging; which (3) led to re-evaluation of teaching methods.

Teacher skills in integrating technology, pedagogy and content

To use technology well, teachers must understand how to integrate technology, pedagogy and content. TPACK (Mishra & Koehler, 2006) is a well-researched model for how teachers become skilled at this integration. Bond (2020), in a meta-analysis of pandemic teaching research, said ‘even experienced teachers struggled with making the switch to remote online learning’ (p. 206). Hodges et al. (2020) described how we must view pandemic teaching as an evolution from pre-pandemic teaching, to *emergency* remote teaching, and then to more careful first redesigns. Regardless, the pandemic has accelerated teacher efforts to integrate these skills.

Interaction and student engagement

The strongest pedagogical theme observed was keeping students engaged—a massive challenge—‘[some] students...completely checked out’ (Osborne, 2021, Lack of student engagement, para. 1). In other cases, it has been worth the effort—students ‘join Zoom...they are learning’ (Some students thrive, para. 3). Beyond ICT, Ferlazzo (2021) described visiting the porches of students' homes to engage with students and parents and learn about their community. Weiss and García (2021) quoted teachers about the importance of their connection with students:

...relationships and connection matter most...building connections with students can happen virtually...Connection. Connection. Connection...it has proven true over and over again...it's connection, not content, that counts. (Connection is critical, para. 1).

Many educators found that grace and connection were the keys to navigating the challenges of the pandemic (para 1).

Student Learning That Thrived

Learning losses have been serious. Even a 'best-case' scenario (Engzell et al., p. 1) from the educationally-advanced Netherlands showed a one-fifth loss in learning. A 60% greater loss was reported in less educated homes.

Still, from critical discussion and literature, the authors argue for increased learning in selected areas. These areas reflect the real-world concerns of the pandemic, consistent with the notion that real-world learning is powerful. This learning demonstrates constructivism in action, where each student has a unique knowledge starting point, and students possibly learn different things. Such learning is more difficult to assess, but highly relevant. The learning observed generally reflects the so-called 21st century skills, and the 4 Cs: communication, collaboration, critical thinking, and creativity.

Emergency response

The authors agreed that children learned deeply about how to respond to emergencies in life. Parents engaged their children in matters of finances, domestic affairs and the dynamics of survival. On one hand, these were the *relative emergencies* of people with means. On the other hand, they were literal life and health emergencies for people of low and high means.

Technology learning

Students learned much about using technology for communication and education. Daily use requires not only basic skills, but the ability to navigate technology tools and solve inevitable problems. Fensterwald (2021), quoting a third grade teacher in California, U.S., said:

A lot of the learning we've done this year - how to use technology...I think my students understand really deeply. (para. 13)

Learning about science, evidence, and global connectedness

Students have personally witnessed the response of professionals and the impact of science, evidence, and how people are connected. Students have seen the positive

and negative elements of this phenomenon. The global efforts to discover vaccines and drugs represent positive learning for students. Students have seen acceptance of evidence, rejection of evidence, and legitimate debate. They have seen illegitimate debate over issues. It is an exam far more real than those usually sat for by students.

Health learning

The pandemic has shown the necessity of hygienic and healthy habits, from washing hands to using sanitizers and healthy eating. Students have learned about vitamin-rich food, and they learned to avoid risky social settings or to be safe in them. They learned the importance of staying fit since obesity is a COVID comorbidity.

Mental health learning

One way to manage mental health is to achieve self-efficacy around topics. For some students, the pandemic has been a route toward self-efficacy. Osborne (2021) reported observations of students who ‘learned to be more independent and manage their time better’ (Some students thrived, para. 7). Other students experienced less peer pressure and bullying. Even for students who found the situation more stressful, many learned about taking care of their mental health; for example, through UNESCO’s Minding our Minds campaign (Loiwal, 2020).

Of Great Significance: The Digital Divide

The authors intentionally saved most issues of the digital divide for this section. All students have faced pandemic challenges. That said, the challenges of those with means differed greatly from those without.

For example, consider this paragraph from the authors’ development of this paper.

The availability of the Internet, of affordable internet resources and 4G data packs, and of smartphones at affordable prices, are some reasons for the sudden peak rise of online education in India...the main advantages of online classes are: quick access, comfort of learning from one’s home, convenience, flexibility, reduced cost, improved communication skills, better teacher-student interaction. Stronger teacher-student bonding facilitated the teaching and learning process.

This contains truth for students of means. It will sound like nonsense to a student, parent or educator without means. Such students struggled to find phones and reliable Internet. Their experience was hanging from trees (‘tree classroom’) to get cellular signals (Railway Children India, Tree classroom, para. 1), or of using their fathers’ maybe-smart-phones for school (at least until fathers found themselves at work during later waves) (School Principal, personal communication, June 2021).

Data makes clear the reality in India. One in ten households have a computer. One-quarter have Internet access. In cities, 42% have Internet access. In rural India, 15% have that capability (*The Hindu*, 2020). It is no surprise that Vyas (2020) highlighted ‘tech-free innovations’ like the Mohalla (neighborhood) classes (So, what can be done?, para. 1) , or delivery of printed workbooks, or turning a whole village into an open classroom. Policy prescriptions must try to close the digital divide moving forward, but they must also account for it now.

Policy Recommendations

The following are recommended policies that might be carried out at the school, city, regional, state or national level to secure teaching and learning wins. Implementation can happen along a continuum from lesser to greater interventions, from removing disincentives, to providing incentives, to providing support structures, and finally to providing programs (Wilson, 2005). Dissemination of results accompanies all recommendations made below.

1. Leverage pandemic learnings into post-pandemic systems

a. *The ICT Highway*

Use new/improved delivery mechanisms as highways to deliver content to underserved communities. Examples include WhatsApp, Zoom, Google Classroom, and other ICT tools. Imagine more vocational education, skill development; remedial learning programs; and accelerated learning programs delivered to these communities, and the resulting impact.

b. *Students, and Parents*

Whenever new delivery methods are used with students, deliver complementary guidance to parents to help them help their wards (students).

c. *The Old Disruptions*

Identify where new delivery methods can help with traditional disruptions; for example, students out sick, teachers caring for family, etc.

d. *A Mile Deep, An Inch Wide*

Research the decisions teachers made about what content to keep and what to skip, and where it improved experiences; make changes permanent.

2. Celebrate and leverage pandemic teaching heroes

a. *Teaching Heroes as Fellows*

Identify local education heroes of the pandemic and create an Innovation Fellows program to secure wins and drive innovation.

b. *Master Teacher for Online Instruction*

Identify and develop the most effective online teachers in public and private systems and for underserved populations.

3. Bring fresh research focus to the teacher-student relationship and student engagement

a. *Re-examine through research the teacher-student relationship*

Do this in light of the pandemic experience, including main elements of the relationship. Disseminate findings.

b. *Teacher-Student Relationship and Technology*

Research, document, and disseminate findings on best practices of how teachers maintained relationships with students via technology. Prepare and deliver related training.

4. Re-evaluation in light of the pandemic

a. *The Pandemic and Assessment*

Conduct research that re-evaluates assessment methods in light of the pandemic experience.

b. *The Pandemic and Social-Emotional Learning*

Use lessons from the pandemic to reconsider the balance between academic, social and emotional learning.

5. Research and disseminate other learnings to widen adoption

a. *The Best National Content*

Conduct research to determine which national government content was most useful, and why. Redouble the efforts to disseminate that content. Publish findings that can inform new content.

b. *The Pandemic, Video, and Flipped Classrooms*

Disseminate what worked in recorded video; advocate and train to accelerate adoption, especially toward implementation of the flipped classroom.

c. *The Pandemic and ICT Tools*

Research what worked with WhatsApp, Zoom, Google Classroom and other non-technology solutions, across all communities. Advocate and train to accelerate adoption in underserved communities.

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