

THE BROOKINGS INSTITUTION

BROOKINGS CAFETERIA PODCAST

HOW EDUCATION TECHNOLOGY CAN IMPROVE LEARNING FOR ALL STUDENTS

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PROCEEDINGS

DEWS: Welcome to the Brookings Cafeteria, the podcast about ideas and the experts who have them. I'm Fred Dews. Technology and education held out the promise that it would radically transform learning and teaching, especially in low- and middle-income countries. Just put a device in students' hands and they would begin learning instantly, but as new research from the Center for Universal Education at Brookings shows, this is not necessarily the case. In a new report, researchers find tech's impact on teaching and learning has been limited largely because tech has been used to replace analog tools.

On this episode of the Brookings Cafeteria, I speak with two of the authors of this new report titled "Realizing the Promise: How can Education Technology Improve Learning for All?" Alejandro Ganimian is Assistant Professor of Applied Technology and Economics at New York University and a non-resident fellow in the Center for Universal Education. Emiliana Vegas is Co-director of the Center and the senior fellow in the Global Economy and Development Program at Brookings.

Also on today's show, expert Molly Reynolds on what's happening in Congress, including whether another Government shutdown due to funding disagreements is possible and a look at a new COVID-19 relief package proposed by Senate Majority Leader Mitch McConnell, why it failed, and the politics behind it. You can follow the Brookings Podcast Network on twitter @policypodcasts to get information about and links to all our shows including Dollar and Cents, the Brookings trade podcast, the current and our events podcasts.

First up, here's Molly Reynolds with what's happening in Congress.

REYNOLDS: I'm Molly Reynolds, a senior fellow in Government Studies at the Brookings Institution. The Senate returned to Washington this week from its annual August

recess with Senate Majority Leader Mitch McConnell bringing to the floor a so-called skinny, or targeted, COVID relief bill with a price tag of roughly \$300 billion.

That's smaller than not just the \$3 trillion package democrats passed out of the House all the way back in May but also the approximately \$1 trillion measure Senate republicans themselves put forward in July. The package contained a number of items McConnell had said for weeks are priorities of his, such as liability protections for businesses. It also contains more limited versions of some items democrats have pushed for rather than extending the \$600 a week in supplemental unemployment benefits that expired in July for example.

The republicans' proposal includes \$300 in additional support. Reports indicated that McConnell's threshold for bringing the bill to the floor was an expectation that he had at least 51 votes for it, even though, like most legislation in the Senate, ending debate on it required 60 votes. In the end, 52 republicans voted in favor with only Rand Paul of Kentucky opposing. Why the emphasis on getting to a simple majority even if the bill wouldn't advance?

Republicans are trying to keep their majority in the chamber and with election day drawing closer, McConnell is likely looking for a way to blame democrats for failing to help millions of Americans. By changing the scope of the conflict in this case from broader to narrower, McConnell is hoping to alter the terms of the debate itself. Divisions within the republican conference, however, made getting to near unanimity within the party difficult.

The \$1 trillion packet that Senate republicans offered in July was the result of lengthy negotiations within the party with some in the conference skeptical that an additional package of any kind was necessary. More recently, a proposal advanced by Senator Ted Cruz of Texas for a tax credit to support private school tuition proved to be a stumbling block. Returning the party to a debate over school choice issues that had flared in early 2017 when, because of opposition

from two republican Senators in part because of her past advocacy for charter schools and vouchers, Betsy DeVos was only confirmed as Secretary of Education after Vice President Mike Pence broke a tie, the first time a cabinet secretary was confirmed in that fashion.

In addition, their proposal omits a number of proposals advanced by Senate republicans in vulnerable re-election races this fall suggesting that, in order to get other members of the party on board, republican leaders had to forego even some items targeted at helping them hold the chamber. It's not just these divisions within the Senate republican conference that have slowed the progress of additional relief legislation.

Differences between Congressional republicans and the White House over priorities in the overall size of the package have also been an issue. Treasury Secretary Steve Mnuchin has said that the White House could agree to a bill costing up to \$1.5 trillion, decidedly larger than the skinny measure McConnell is currently proposing. In addition, President Trump's priorities, like a payroll tax relief, have differed from those of his Congressional co-partisans, making it harder for the party as a whole to gain leverage in negotiations with Democrats.

As we approach the end of the month, moreover, the debate over additional COVID relief for millions of Americans threatens to run to the deadline for another important piece of legislation, one keeping large parts of the Federal Government open after October 1st. Importantly, deadlines often work for forcing Congressional action, especially when a large package can be crafted in such a way that it attracts broad support by combining lots of different priorities.

The expiration of funding for many government programs weeks before a presidential election and with millions of Americans looking for additional aid in the midst of a global pandemic is quite the deadline, but Mnuchin, who has taken the lead in most high-profile

negotiations with the democratically controlled House over the past two years, and Speaker of the House, Nancy Pelosi, have reportedly agreed to seek a so-called clean continuing resolution that would keep the Government funded past the election.

The length of a temporary stopgap spending bill remains an open question, in part because of the incentives of the two sides depend on their expectations about the outcome of November's elections. If democrats take control of the White House and potentially the Senate, it is in republicans' interests to have the short-term measure expire in December, giving them one additional chance at forcing acceptance of some of their priorities, but under that same scenario, democrats could have reason to push for a longer measure that doesn't expire until 2021.

They might also fear substantial republican obstruction at the start of a new Congress. While a shutdown remains unlikely, it remains possible that the two issues, government funding and COVID relief, end up linked. Either way, the millions of Americans who are awaiting additional federal action will be watching what's happening in Congress.

DEWS: And now my interview with Emiliana Vegas and Alejandro Ganimian. Okay. Emiliana and Alejandro, welcome to you both to the Brookings Cafeteria podcast.

VEGAS: Thank you for having us.

GANIMIAN: Thank you.

DEWS: I'd like to start by asking you each to introduce yourselves to our listeners. This the first time you've both been on this podcast. Emiliana, why don't you start with introducing yourself?

VEGAS: Sure. Thank you, Fred. My name is Emiliana Vegas. I am a senior fellow and co-director at the Center for Universal Education at Brookings and I have been working in education in developing countries all my career.

DEWS: Alejandro?

GANIMIAN: Great. So I'm an assistant professor in applied psychology and economics at the Steinhart School of Culture, Education, and Human Development at New York University and currently I'm also a non-resident fellow at Brookings Institution. I've been working with Emiliana for many, many years.

DEWS: Excellent. Also, Alejandro, I want to say that I, like yourself, am a graduate of the Georgetown School of Foreign Service, known as SAFS.

GANIMIAN: Yeah. Fellow SAFS indeed.

DEWS: Well, let's get into the substance of the conversation which is Ed Tech. It's the paper that you both co-authored with Frederick Hess, who is a scholar at the American Enterprise Institute and it's called Realizing the Promise. How can Education Technology Improve Learning for All? It seems very timely.

We are recording this at a time when a lot of schools across the country, elementary schools, colleges are gearing up for classes, many of them virtually. Can you give some background on what is the ed tech issue that you are researching and write about, how it's being used in classrooms and so on?

VEGAS: So maybe I'll start and, Alejandro, you can complement. So I think Alejandro and I really shared this concern along with Rick that, while technology had really changed almost every aspect of the economy, how we live and how almost we breathe, it hadn't really changed the way schools operate across the world and that's not because there weren't a lot of ed tech entrepreneurs making efforts to deliver hardware and software to developing countries or governments investing in education technology, but rather we thought because it wasn't being employed wisely to really enhance the work of teachers and to accelerate learning.

So that was the beginning of this work was really how can we think differently about how to integrate technology into classrooms. And then COVID came and we then had to think about technology outside of classrooms as well.

GANIMIAN: That's right. And just to speak to what types of iterations we're discussing in this report, ed tech is a catchall term. Right? So it refers to use of technology for education purposes, whatever that is. So it can be hardware. It can be desktop computers, laptops, tablets, smart phones. It can be software. It can be remedial or adaptive software or any audio or video-based solution. So TV based instructions, pre-recorded lessons, video tutorials. It's quite broad in that respect.

DEWS: So in the research that you've done, is your focus global which includes the U.S. or is it mostly, as you just kind of said, Emiliania, in developing countries?

VEGAS: So we do a very in-depth literature review of what's the rigorous evidence from developing countries because our focus is really closing that gap in learning between the poorest countries in the world and those that have more resources and really trying to think of what were cost-effective ways of integrating technology. So more in developing countries.

DEWS: So when people think about ed tech in classrooms anywhere around the world, I think the initial impression is great. That sounds like a great thing for students to have some technology in their classrooms. So, of course, it's going to help students learn better. Are those assumptions correct?

VEGAS: Well, it all depends, as we economists like to say. And it really depends on how the students are engaging with the technology, what the content is like and then how teachers are using it as well. So we talk a lot in our report about a longstanding framework that two prominent U.S. educators, Deborah Ball and David Cohen, coined which is kind of like the

instructional core triangle.

It includes sort of the interactions between students and content, teachers and content, and students and teachers. And we argue that, as they did back when they coined it, they said, you know, all these reform efforts in the U.S., a lot of school reforms, have not had the expected impact on learning because they haven't really thought carefully about or really been designed to effect this instructional core or this triangle between students, content and teaches and we argue that the same problem is what we're seeing in the developing world with ed tech is that, you know, a lot of countries have bought devices like laptops and tablets and distributed them, but they haven't really thought through carefully how can they really be used by students, by teachers, to accelerate learning and so that's kind of where we start.

GANIMIAN: That's right. I think what I would add is maybe if you want to think about it broadly in terms of sort of the evidence based least successful have been these types of efforts and Emiliana was describing which are just purely hardware-based initiatives. Right? Where you're giving either free laptops or free desktop computers to students with software and expecting them to use it. So typically those types of initiatives do not improve student learning in core subjects.

In fact, they haven't even improved student learning in computer related skills because the laptops are quite specific in their specifying the software that they use and sometimes they have even led students to use them for recreational purposes. Right? Such as games. Then sort of a more promising level of evidence would be remedial software products so think about educational programs that help students practice what they've learned in the classroom in a given week.

So these typically have led to small to moderate improvements in learning and they fall

short, however, of addressing a broader problem which is that many students are not even at the preparation level that the curriculum assumes. And so maybe perhaps the strongest evidence or the most promising evidence that we have is on software that is able to adjust to the level of preparation of a student, not just the level or grade at which he or she is learning. So we can discuss that at greater length, but basically if you have students at all levels of preparation within the same classroom then software that actually complements regular instruction by just taking them where they are and helping them move forward a little bit, whether they're very low performing or very high performing and need something more challenging than that can be a useful complement to business as usual instruction as Emiliana was describing at the beginning.

DEWS: I definitely want to follow up on that question of how ed tech can complement students' learning rather than be the only platform for it. I want to follow up on this other point though because you make a really interesting point in the paper that governments have often favored popular over effective education reforms especially in the technology space. Can you talk a little bit more about that?

VEGAS: Throughout Latin America, for example, a lot of governments have invested a lot in providing the then called one laptop per child and then later other brands or makes of laptops and tablets and you see a lot of events where the president of the country or another high-level leader will be there with the children and it's extremely popular.

Yet, there have been rigorous evaluations, for example in Peru, of the one laptop per child program that showed that it didn't lead to students learning more and, as Alejandro was saying, didn't even necessarily come to really understand how the computers worked or operated so the investments have been very disappointing in achieving what they really were promising which was initially even some would have argued look, you just give a kid a laptop and they'll

have access to all this information and they'll be able to learn on their own.

Education will become cheaper. We won't need teachers anymore and, in fact, the evidence shows that teachers continue to be the most important factor on the school side for student learning and that technology, as much as it has evolved, it still has been short of its promise.

DEWS: Another factor that you pointed out in the paper and that we're discovering or we already knew here in the United States is that a lot of students don't have access to internet connection or a sufficient internet connection. I imagine in many parts of the world, a lot of children don't have access to sufficient electricity to power their laptops.

VEGAS: I was working back in Central America for example where there were some countries doing this and you would find schools that had electricity but, for example, didn't have enough power outlets in the classroom to power up all the laptops that the children had and so there is a lot of what we say is look. You first have to really understand your context and that includes infrastructure, but also capacity of our actors. What's the teacher capacity to engage in technology effectively and how can you build that up before you actually introduce technology?

GANIMIAN: That's right. So in the playbook, we made the argument that any government interested in investing in education technologies, should start by assessing (a) its specific needs to improve student learning. So is it about raising the average level of achievement? Is it about remediating gaps among low performers?

Is it about challenging the high performers? So, number one is what do you want to do with it which I think was sorely missing from some of the initiatives that Emiliana described have been so popular to date in developing countries. Number two is what you were mentioning. Right? So assessing the infrastructure to adopt technology and enable solutions. So what's your

electricity connection? What's the availability of space and outlets? Stock of computers, internet connectivity.

And, thirdly, perhaps most underappreciated, what is the capacity of your school system to integrate technology into the instructional processes. Now, this might seem like a very minor obstacle, but students' and teachers' level of familiarity and comfort with hardware and software and their beliefs about the usefulness of technology and the current uses of said technology I think is an important factor for school systems to keep in mind before they embark on these grandiose reforms.

I mean hindsight is always 20/20, but several of the one laptop per child initiatives that Emiliana was describing failed for some of these very common-sense reasons that we're enumerating here.

DEWS: So it sounds to me like in some cases school systems, governments around the world, saw this emerging technology for education and said let's just do it rather than examining whether they should do it at all. You have this really interesting line in the paper that just because technology can do something, it does not mean it should.

VEGAS: Yeah. And that's right. We see a lot of countries that were almost expecting technology, like many other education reforms I might add, to be a magic bullet. That all of the sudden that would solve all the problems and, in reality, technology is another tool and it provides another resource.

That said, the three co-authors really strongly believe that it can be leveraged much better and that it's true that it has these, as we say, four comparative advantages that can really accelerate learning which we can now if you want to turn to discuss, but we make a big effort to say let's think differently about technology. I'll give it to Alejandro to tell you because we

worked together on this.

GANIMIAN: We tried to identify what technology is well-positioned to do as a complement to regular instruction. Then we asked ourselves well, to what extent has that actually happened. Right? So the four competitive advantages that Emiliana is mentioning is first of all scaling up what works.

So, you know, if you have standardized materials, if you have standardized instructional methods then technology is very well positioned to disseminate those practices or those materials to other teachers who might be in need of them. Right? The second one is trying to expand opportunities for student practice. Right? So if instruction is mostly about the teacher explaining a topic and if the classrooms are very large, both of which are true in many developing countries, then you might want to use technology to complement the school day with opportunities to practice for students.

A step further would be to say, well, not only do I have many students, but I also have students performing at very different levels, even if they're all enrolled in the same grade. Then how can I use technology to facilitate differentiated instruction? Now, it does not matter how great or how phenomenal of a teacher you are. It is impossible for you to teach at 30 different individual student levels at the same time. Right?

So technology can help you with that. And then finally and perhaps the aspect that has been least well explored by the evidence to date is trying to increase student engagement. Right? So if it's really hard for students to interact with the material or with the teacher during the class time for several of the obstacles that we've already mentioned then technology can play a great role in, say for example, doing a flip classroom and having the students engage with the materials that way after the school time or improving communication between the teacher and

the students or even something that we don't explore in this report, but that we mention improving communication between teachers and the parents as well. Right?

So those are things that technology could in theory do well and in the report we discuss to what extent we have certainty that it has done well.

DEWS: One of the things that the Center for Universal Education is known for is not just the pure research, which is great, but also the Center has for many years provided tools for officials, practitioners to put this kind of research into place. So given that, in the report, how can education leaders, government officials kind of use the report and the tools in it to kind of ask those questions of their school systems to try to implement education technology in the ways that Alejandro was just describing?

VEGAS: One type of tool that we include, although it's by no means the only one, is we include some very short sort of survey instruments that decision makers can take on and just apply and they would ask students, teachers and school heads about the different aspects of technology ranging from infrastructure to what their beliefs are and how they use it at the moment and the goal of those instruments is to help them really get a better picture of what's happening in their own context, but we also encourage them to use data that they already have.

You know a lot of these systems in the developing world have quite good administrative data and so they may not need to apply a specific survey or they may be part of an international assessment of student learning such as at the Program for International Student Assessment of the OECD and they have some questions. So we model from existing surveys and we kind of develop the most parsimonious set of questions that one would need to ask to kind of help them do this quickly and then hopefully we also have another instrument—not quite an instrument—but just a set of questions that go towards that key aspect of what are you trying to change and

how would that change what happens in classrooms.

In the U.S. we saw big investments in smart boards in classrooms and in many cases that didn't change traditional chalk and talk construction and just replaced a blackboard and yet it was a much more expensive, if you will, type of technology for teaching and learning in the same way.

So that's kind of the message we want to convey is let's not repeat those mistakes from the past and let's really be much more thoughtful before we invest in technology on what it is that it can and we can expect it to do to change the daily interactions between students and teachers and between students and learning materials.

DEWS: Let me step back and again ask you both to look at sort of the big picture, the context in which we find ourselves, which is a worldwide pandemic, Coronavirus. And you mention in the report over the past few months I mean up to 1.5 billion schoolchildren have not been in school because of restrictions on the coronavirus and then we are throughout the world and in the United States resuming school.

Does the fact that we are now in this environment where there is a premium on distance learning and remote learning change the ed tech atmosphere? Does it change your perspectives and your conclusions that you've been talking about in your report?

VEGAS: I wouldn't say it changes them. I think it gives them an enhanced opportunity to be used I hope. Maybe I'm being too optimistic, but I do think that teachers who maybe in the past were hesitant to embrace technology because they had a way of teaching in their own classrooms that had worked for them for years and now had no option but to quickly have to engage with technology.

Our hope is that these kinds of messages that we're conveying will help decisionmakers

support teachers in that process. I think similarly parents are seeing firsthand the value that schools and teachers represent for them and for their children and yes, as you say, the pandemic has caused too many of us to stay and work and learn from home. And so what will we do if it weren't for technology? Right? Those of us who have access to it.

I think it gives it a new opportunity to really be used creatively, but it also creates an even wider sense of the inequality that we face in the United States and in the world between those who have access to technology and those who don't and those who have access to teachers who can use technology effectively and those who can't.

GANIMIAN: Two ways in which I think COVID-19 has affected the way we think about the added value of ed tech to the school system is first and foremost, I think as you said, Fred, it's a great opportunity for experimentation.

I would take this opportunity very seriously and if I was a leader of a school system, I would try to closely monitor, use it, and implementation of intention. So how much time are students actually interacting with the material that we want them to interact? How much time are teachers using the tools that we've provided to them? Because that can give us some clues as to the promise or scaling this up or even sustaining these practices beyond the pandemic. Right?

Not only tracking them, but to the extent that it is possible, trying to evaluate the effect that this has had on learning outcomes and there are great undulations recently by a team of researchers at Columbia University and the World Bank in doing phone-based assessments of student learning to try to understand how the pandemic is affecting those students.

So tracking implementation and monitoring effectiveness I think are great ways to take advantage of the opportunity. On the flip side, though, I think it's worth acknowledging that we've all been pushed into this enhanced use of technology in a way kind of against our will or

not fully with our will in mind. I think it would be wrong to conclude that if teachers or students or families are having trouble adjusting to this transition, it is because they simply don't want to or because they can't. Right?

And so understanding the context in which this increase in need for education technology has occurred, I think is an important piece of information for interpreting the data.

DEWS: All right. So kind of looking ahead, your report concludes with five steps looking ahead to policymakers, education officials and so on could take. Could you kind of walk the listeners through some of what your conclusions for action are?

VEGAS: Well, the first one won't surprise our listeners, or you, Fred, because we've been talking about that a lot which has to do with carry out a survey to understand the current practices and potential barriers to adoption of technology in your own system because it will vary system by system.

The second one is also to really be very thoughtful about how the introduction of technology may affect the student and teacher interaction. So really think about as we were saying before is the laptop just going to replace a regular notebook and a pencil or is the smartboard just going to replace the old blackboard, but not really change the nature of the classroom interactions.

Then define really clearly—Alejandro was saying this very well before—that some systems have the problem that they have 80 percent or more of their students without the basic reading and math skills they need to continue to learn and so big challenge for those systems is getting everybody up to a regular level that then they can continue learning.

Others have a small proportion of students in that category and a small proportion of very high performers and then everybody in between. And then how do you move students across a

learning spectrum in that kind of system. So define clearly what it is that you're trying to achieve with the introduction of technology.

And the last two is really that we make a strong case that how the reform is implemented will really affect its chances of succeeding. So the extent to which you can involve educators, parents, school leaders. All those who are going to be involved in using the technology is critical to ensuring that you are designing it well. And, finally, just communicate extensively about what you're hoping it will achieve and what you know it will not achieve. So manage your expectations. That is another kind of critical recommendation.

GANIMIAN: I fully agree with all of that. I think if I can add one thing is if people are looking to the playbook as a report that will tell them what is the one intervention with the most promise that they can implement everywhere, they will be sorely disappointed.

I think a key message from the report is it matters where you start, what you want to do it for, and then look at the evidence with that lens in mind. Right? So I think in a way we're doing this for education technology, but the lesson applies more broadly which is try to take stock of where you are and what you want to do and then look at the evidence. I think that's an important message because I don't think that's how we've been looking at the effect of educational interventions to date including that tech.

DEWS: Well, I want to thank you both, Emiliana and Alejandro, for sharing today your time and expertise on this very important policy question. I appreciate it.

VEGAS: Thank you. Thanks so much.

GANIMIAN: Thank you for having us.

DEWS: You can find the new report "Realizing Promise: How can Education Technology Improve Learning for All?" on our website [Brookings.edu](https://www.brookings.edu). On Monday, September

14, the Center for Universal Education hosts an event on how the COVID-19 crisis presents a leapfrog moment to transform key elements of education systems, putting schools at the heart of social and economic recovery.

Either tune in to watch the webinar live or after Monday see post-event video. Former Prime Minister of Greece, George Papandreou, delivers opening remarks. The Brookings Cafeteria podcast is made possible with the help of an amazing team of colleagues.

My thanks go out to audio engineer Gaston Reboredo; Bill Finan, director of the Brookings Institution Press who does the book interviews; Marie Wilkin, Adrianna Pita, and Chris McKenna for their collaboration; and Camilo Ramirez and Emily Horne for their guidance and support. The Brookings Cafeteria is brought to you by the Brookings Podcast Network which also produces Dollar and Cents, the Current, and our events podcast. Email your questions or comments to me at bcp@brookings.edu. If you have a question for a scholar, include an audio file and I'll play it and the answer on the air.

Follow us on twitter [@policypodcasts](https://twitter.com/policypodcasts). You can listen to the Brookings Cafeteria in all the usual places. Visit us online at [Brookings.edu](https://brookings.edu). Until next time, I'm Fred Dews.

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(Signature and Seal on File)

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