Futureproof Classrooms

Adopting hybrid and blended learning technologies for more resilient education

BenQ

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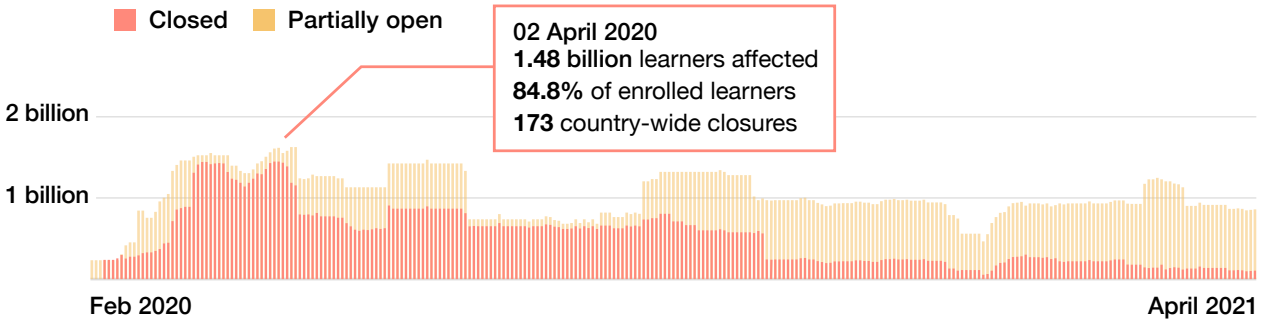
THE NEED FOR RESILIENT LEARNING ENVIRONMENTS

With concerns about the pandemic quickly ebbing in the US, hybrid learning may once again become an afterthought for some in the education sector. Though originally adopted as an interim response to the health crisis, hybrid learning technologies are set to outlast their temporary purpose.

In April 2020, when the world was still feeling the first pangs of COVID-19, an estimated 1.48 billion learners were affected by school closures across 173 countries.[1] This meant that the progress of 84.8% of all enrolled learners worldwide was stalled significantly.



▲ **Figure 1. Global school closures due to COVID-19**

This predicament prompted several schools to go virtual, taking their classes online either fully or partially. Many saw these changes as a momentary quick fix to an issue that would eventually get resolved. But a year later, with the pandemic still very much in full swing for the rest of the world, the need for flexible learning models has become more pronounced.

In the US, Congress has pushed for measures to fast-track the return of in-person learning. The goal, as it's framed by the media, is to get schools running back to normal.[2] Many analysts warn that merely aiming to revert to how things were done pre-pandemic may prove counterproductive in the future.[3] Schools must learn from their current experiences and make long-lasting changes that would improve their operational resiliency in case major disturbances—such as another global outbreak or natural disaster—were to happen down the line.

Although seen as a fleeting buzzword by its critics, hybrid learning and the spaces designed to support it actually offer educational institutions and their students the most stability when compared to both in-person and online learning models.

This e-book gives you a better idea of what hybrid learning's pros and cons are and how schools across the US can adopt educational technologies (EdTech) so that they can readily implement this learning mode and utilize its advantages in the post-COVID era.

WHAT WE MEAN BY "HYBRID"

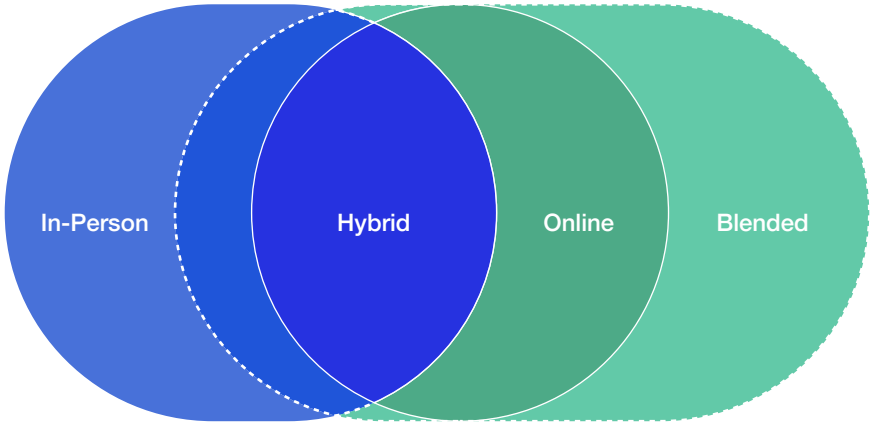
In order to make sense of hybrid learning, we need to quickly clarify some related terms: in-person, online, and blended.

In-person learning happens when both the teacher and students are face-to-face and hold learning activities in the same physical location, such as a classroom. Online learning is when teaching is done solely over the internet via forum threads, video conferencing, live cloud whiteboarding, and other means.

The term blended learning refers to the blending of technology with traditional modes of instruction.

A simple application of this type of learning is using slide presentations or educational videos to better illustrate concepts in class. More advanced forms of blended learning incorporate other media like video games, artificial intelligence, and web-based interactive tools.

Hybrid learning is a subset of blended learning. It's an educational setup that has both in-person and online components. An example of this scenario is when a teacher holds a class with students in the same room, while home-based students join in real time via video conferencing.



▲ **Figure 2. Overlaps between learning modes**

Under hybrid learning, we also need to talk about cohorting, a concept that has become mainstream due to the pandemic. Cohorting is the practice where people are grouped together as a cohort and then isolated from other groups. Doing so effectively decreases the number of people they're exposed to, lowering the chances of catching or transmitting diseases beyond their own cluster.

If done correctly, cohorting also makes it more manageable for schools to track and quarantine individuals in the event of an infection.

These terms will come in handy as we tackle the differences between each of these learning modes and assess their short and long-term value in the context of formal education.

THE GREAT DEBATE: ONLINE VS HYBRID VS IN-PERSON

When discussing the merits of each learning setup, we have to make a distinction of its benefits during and after the pandemic. Although it may seem trivial to review what the education sector did at the height of the health crisis, it is actually essential to do so as it provides a baseline for designing futureproof classrooms and learning spaces.

SHORT-TERM: SCHOOLING IN THE MIDST OF THE PANDEMIC

Hybrid learning is not necessarily the safest way to conduct lessons during a pandemic. That distinction, according to the US Centers for Disease Control and Prevention (CDC), belongs to online learning.[4] The reason behind this is obvious: online learning offers very little contact among students and teachers. On the other side of the spectrum is in-person learning, which supposedly poses the highest risk as it increases student exposure to possible disease vectors.

When categorizing the risks of COVID-19 transmission in relation to how schools hold their classes, the CDC deemed hybrid learning (provided that it's implemented properly) as a safe middle ground.

Below is a table that briefly summarizes this continuum of risk. The rating for each learning model is influenced by how schools would roll out classes given the following factors:

- **Class size:** How many students are physically sharing the same space at the same time?
- **Cohorting style:** Are teachers and students exclusively staying within their own cohorts or do they mix with other groups? (ex. A teacher tends to two or more batches of students in a day.)
- **Tools:** Are educational tools such as whiteboard pens, keyboards, and the like being shared among different cohorts?
- **Cleaning:** Are classrooms, tools, and common areas frequently cleaned and disinfected after use?
- **SOPs:** Are school staff and students adhering to standard operating procedures (SOPs) and other COVID-19 prevention guidelines?

	Lowest	Lower	Medium	Higher	Highest
Model	Online	Hybrid	Hybrid	In-person	In-person
Size					
Cohorting	No, no mixing	Yes, no mixing	Yes, some mixing	No, some mixing	No, mixed
Tools	No sharing	No sharing	Minimal sharing	Some sharing	All is shared
Cleaning	Not applicable	Regular	Regular	Irregular	Irregular
SOPs	Not applicable	Strict adherence	Strict adherence	Strict adherence	Optional adherence

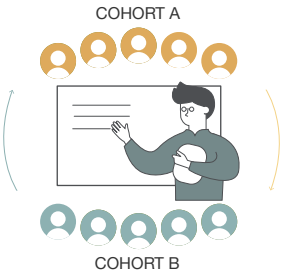
▲ Table 1. Risk assessment according to learning model

If we were to base it on this table alone, it would seem that online learning is the standard schools should adopt in order to keep their students safe and their classes running. In reality, this type of setup is not sustainable. Not every student can afford to take online classes full time, especially those who belong to lower-income families.

Several experts, both in epidemiology and education, have expressed the same sentiments, citing multiple socioeconomic factors as reasons to keep students physically in school during the pandemic, either part-time via hybrid learning setups, or full-time via in-person instruction.[5]

Experts have also debated the amount of risks involved in hybrid and in-person learning setups. Although the CDC deems hybrid learning safer, there are those who challenge this idea. Jennifer Nuzzo, epidemiologist at the Johns Hopkins Bloomberg School of Public Health, noted that the effectiveness of the hybrid model in terms of preventing disease transmission is very much reliant on whether or not remote students actually stay at home.[6]

Martin Kulldorff, a biostatistician at Harvard Medical School, shared the same concern, citing possible scenarios that could make hybrid learning just as risky as in-person teaching, if not worse.[7] In a setup where a teacher is assigned to instruct two or more different cohorts, it may be possible, if precautions are taken lightly, for the teacher to catch the virus from one set of students and then transmit it to another.



Cohorting setups involving shared teachers and teaching tools may increase exposure if safety guidelines are not properly observed.

Parents may need to work and may leave older children unsupervised; these kids may meet with friends elsewhere, exposing themselves to risks.

Busy parents may also leave younger children at daycare or with relatives, further increasing their exposure to other people.

▲ Concerns about hybrid learning during a pandemic

At home, parents and guardians may not have the means to stay with their children because they need to work. In such cases, younger kids may be left at a daycare center or with relatives, exposing them to more people in the process. Much older kids may also skip online classes and use their school time to meet friends from outside their cohort.

But these concerns may be unfounded. Since the start of the pandemic, there have been several reports regarding the very low rates of COVID-19 transmission among younger children.[8] An updated release by the CDC notes that kids between the ages of 5 to 17 are seven to ten times less likely to be hospitalized due to COVID-19.[9] Furthermore, compared to adults, children under 10 have even lower chances of getting infected and transmitting the disease to family members.[10] This data has prompted the US government to speed up efforts to reopen schools, gradually shifting from the hybrid learning model back to in-person training. We shall discuss this in more detail in a later section (Fast-tracking EdTech spending).

Of course, the pandemic is still ongoing. According to Bloomberg projections, it may take seven years for life to fully go back to normal. In February, Bloomberg estimated that it would take the US until the end of 2021 to vaccinate 75% of its population.[11] More recent estimates published by the New York Times actually project that the target will be reached by July 2021.[12] There are caveats though, as cases continue to surge across the country.[13] This only means that for the rest of the year, disease transmission is still a very serious concern for high-risk students and school staff. For cases like this, Kulldorff actually suggests using the hybrid model, but instead of splitting up students into cohorts, it would only be the immunocompromised teachers and students who would join classes via the internet while the rest would be physically present in school.[14]

This is consistent with the revised CDC guidelines published in February.[15] They recommend that schools allow high-risk teaching staff to host hybrid classes remotely or adjust their responsibilities to decrease their exposure.

LONG-TERM: MEETING INSTITUTIONAL GOALS

Beyond the pandemic, the focus now shifts from disease prevention and social distancing to meeting the institutional goals of each school. The three learning setups we've discussed so far have core strengths that match different types of objectives.

Online learning: Opening doors for self-paced education

More than just bridging remote learners and their schools, online learning's true strength lies in how it allows educational institutions to offer asynchronous, student-paced courses. More common in higher and continuing education, these courses are designed for students who are either occupied with work or other responsibilities, or are physically unable to go to school due to geographical restrictions or other conditions.

Web-based curricula give students the freedom and flexibility that standard in-person courses do not. Not confined by rigorous class schedules, students can virtually select their preferred learning modules and complete them at their own pace.

In-person learning: Providing childcare and other social benefits

The most important advantage of in-person learning is its often-overlooked contributions to society. First, it allows students to socialize with their peers and teachers face-to-face in a controlled environment. These interactions are known to help students build the necessary soft skills they will need to succeed in the real world.[16]

Second, by having students, specifically young children, stay in school for majority of the day, parents and guardians are momentarily freed from their responsibility of providing childcare, allowing them to commit their time to work.[17,18] This fact is more pronounced for low to middle-income families who cannot afford to hire caretakers for their children.[19]

▲ Social benefits of in-person learning

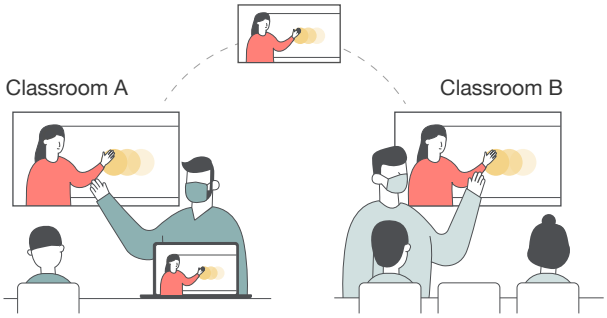
Schools also provide children access to meals, private counseling, and other social services—things they would be deprived of in a fully online learning setup.[20]

It's also been observed that if students regularly attend in-person classes, it significantly decreases their chances of dropping out.[21,22]

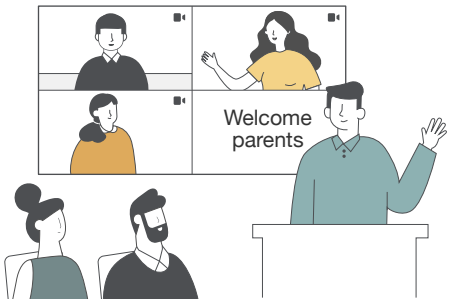
Hybrid learning:
Bolstering schools' operational resilience

As experienced during the pandemic, schooling disruptions have caused millions of students to fall behind with their coursework, stalling their academic progress.[23,24] This unfortunately became the status quo for several months as most schools did not have the right infrastructure and policies to support online and hybrid modes of learning.

Investing in the creation of hybrid learning classrooms allows your institution to swiftly shift between in-person and online setups, or mix both when the need arises. If a new pandemic or some other unforeseen major event were to occur, a school shutdown would not necessarily mean a halt to student progress. With adequate learning technologies and policies in place, schools can readily transition from in-person to hybrid classes.



Learning sessions with guest speakers



Parent-teacher meetings

▲ Other long-term uses of the hybrid learning setup

Having hybrid learning tools in school also allows for more dynamic teaching. Schools can invite remote guest speakers and experts to talk to school-based students via video conferencing and cloud whiteboarding. Multiple classrooms can be patched into one session simultaneously.

Parent-teacher and school board meetings would also benefit from this setup, as it allows parents and guardians to join sessions remotely.

In the next chapter, we will check how far along schools in the US are in terms of technological investments. Are they equipped for operational resilience?

THE CURRENT STATE OF EDTECH IN THE US

A year before the pandemic, a reported USD 18.66 billion had flowed into EdTech companies around the world.[25] Around USD 3.67 billion went to AI-based learning companies while USD 2.97 billion went to mobile learning firms. Funding for higher education learning technology companies increased to USD 740.58 million in 2019, nearly doubling the amount for 2018.

▲ **Figure 3. EdTech investments in 2019**

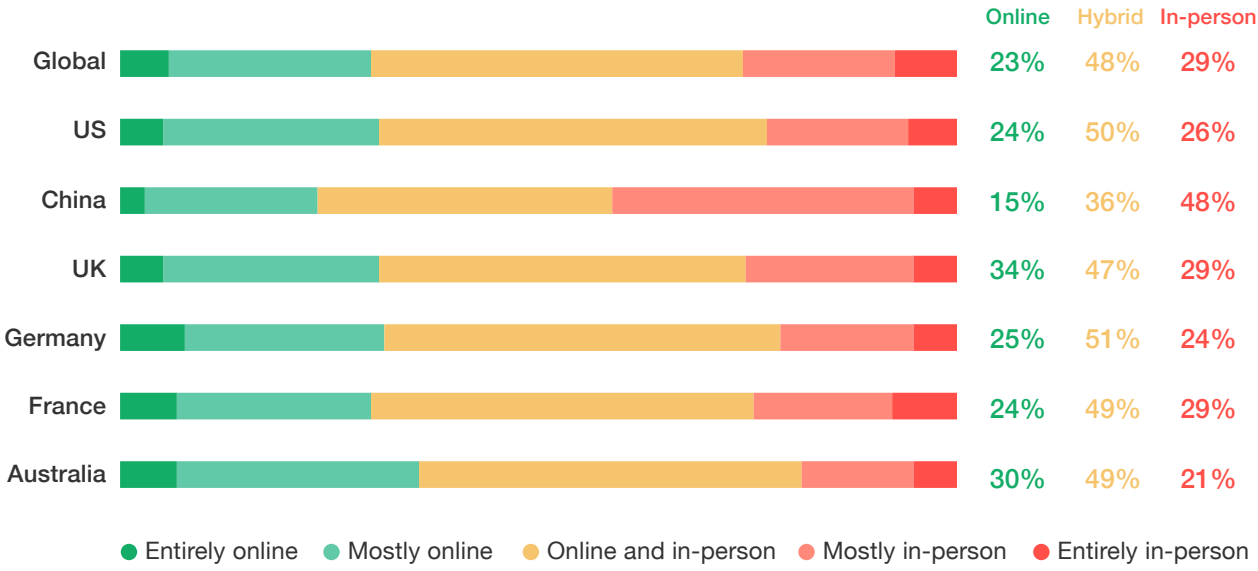
As 2020 progressed, there were concerns about how COVID-19 would affect these investments as well as spending for blended and hybrid technologies in the education sector. Initially, analysts were concerned about the possibility of these funds being cut and rerouted to virus prevention efforts.[26] But as the need for on-campus social distancing and hybrid learning grew, so did the acquisition of educational technologies, particularly of client devices and video conferencing equipment.[27,28]

In the US, sales for client devices, such as Chromebooks, laptops, and tablets for schools, have been steadily growing since 2017, with the demand increasing by 26%. Likewise, spending on audiovisual devices, including displays and speakers, grew by 9% within the same period.

A PIVOT TO HYBRID AND BLENDED LEARNING TECHNOLOGIES

It is important to note that most educational technologies used for hybrid learning are the same ones used for blended learning. Cloud whiteboards, interactive displays, and tablets are also blended learning tools; this means that they can be easily utilized for in-person classes. Once the pandemic ends and schools adjust to their new normal, any investments made to help with the transition to hybrid classes will not be sunk costs. Over the next two years, experts predict a 62% increase in school IT budgets; most of it will be allocated for mobile computing devices, interactive displays, and servers that will be used to bolster data storage and support learning management systems (LMS).[29]

Consistent with these trends are the opinions on how education should be implemented. In October 2020, the World Economic Forum conducted a survey involving 27,500 respondents across 29 countries. They were asked for their thoughts on the education system of their respective state over the next five years.



NOTE: Percentage displayed are rounded off.

▲ **Figure 4. Opinions on how educational setups will evolve until 2025**

Globally, almost 72% of respondents deem that education will have some sort of online component: 23% say that classes will be done mostly online, while the remaining 49% believe it will be rolled out via some form of hybrid setup.[30]

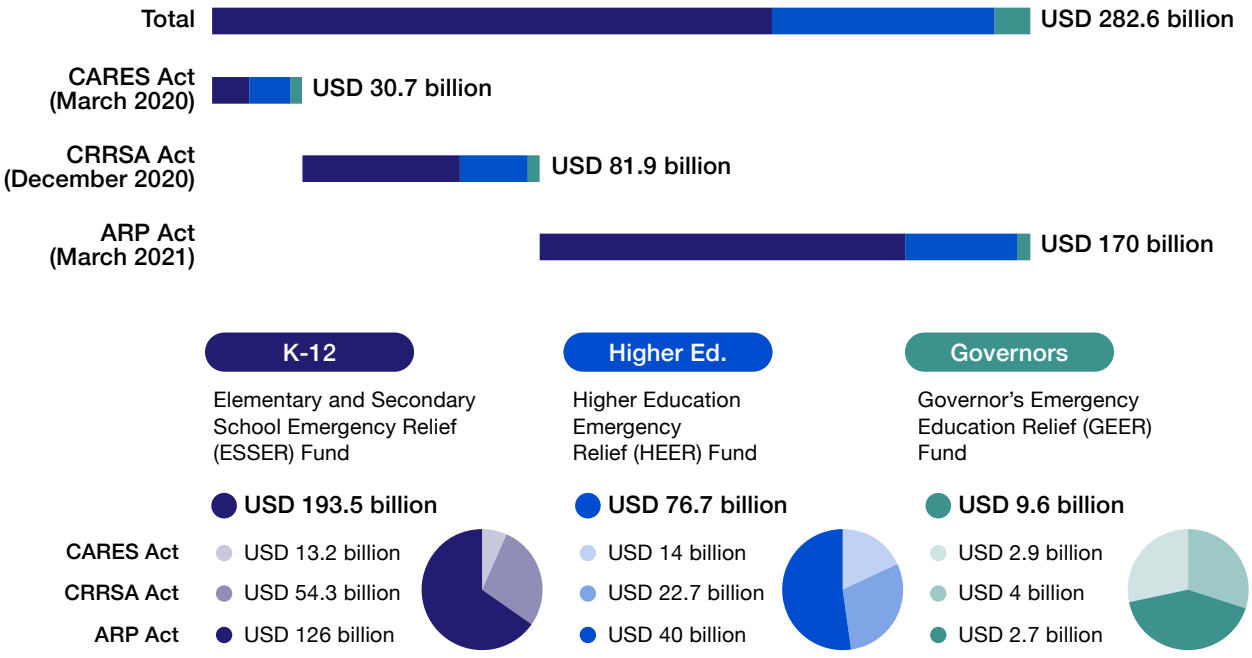
In the US, the figures are almost identical. Around 74% believe that education will be mostly conducted online (24%) or via hybrid setups (50%).

FAST-TRACKING EDTECH SPENDING

In March 2020, the US government passed the Coronavirus Aid, Relief, and Economic Security (CARES) Act,[31] an economic stimulus bill designed to provide emergency assistance to American citizens and to cushion the pandemic's negative effects on several industries. Over USD 30 billion were allotted to education.[32]

This funding initiative was then followed by the Coronavirus Response and Relief Supplemental Appropriations (CRRSA) Act in December, which added almost USD 82 billion for schools across the 50 states. In March of 2021, a full year after the CARES Act, the American Rescue Plan (ARP) Act was signed into law to inject about USD 170 billion into states for the main purpose of reopening schools.[33]

Each of these initiatives is divided into three key segments: K-12, higher education, and a governors' fund, which state governors can distribute at their discretion. Below is a summary showing the scale of each initiative and how the funds are allocated.



NOTE: The figures used are approximate values.

▲ **Figure 5. COVID-19 relief funds allocated for education**

As prescribed by US Congress, the majority of the funds must be spent to: alleviate the disruptions to student progress, improve the capacity of schools to provide childcare services, and facilitate repairs and upgrades designed to make schools healthier, greener, and smarter.

These acts specify that states are allowed to use the provisioned funds to acquire any hardware or software required to meet these objectives. Of note, the government recommends investing in technologies that would improve, among other things, the overall air quality on campus, afterschool programs, and hybrid learning efforts.

HOW TOP SCHOOLS APPLY HYBRID LEARNING

In this section, we will take a brief look at how the top five universities in the world make use of available educational technologies to support their hybrid learning initiatives. By doing so, we can come up with a baseline list of devices and platforms that K-12 schools and other higher education institutions can use as a guide when investing in technologies to support their digitization efforts.

Both the QS World University Rankings and Times Higher Education are consistent with the schools in their top five. The list includes (in alphabetical order): California Institute of Technology (Caltech), Harvard University, Massachusetts Institute of Technology (MIT), Stanford University, and the University of Oxford.[34,35]

COMMUNICATION AND CONFERENCING

These top universities, much like enterprises, give students the option to create organizational accounts which they can use for school-related communications and video conferencing.

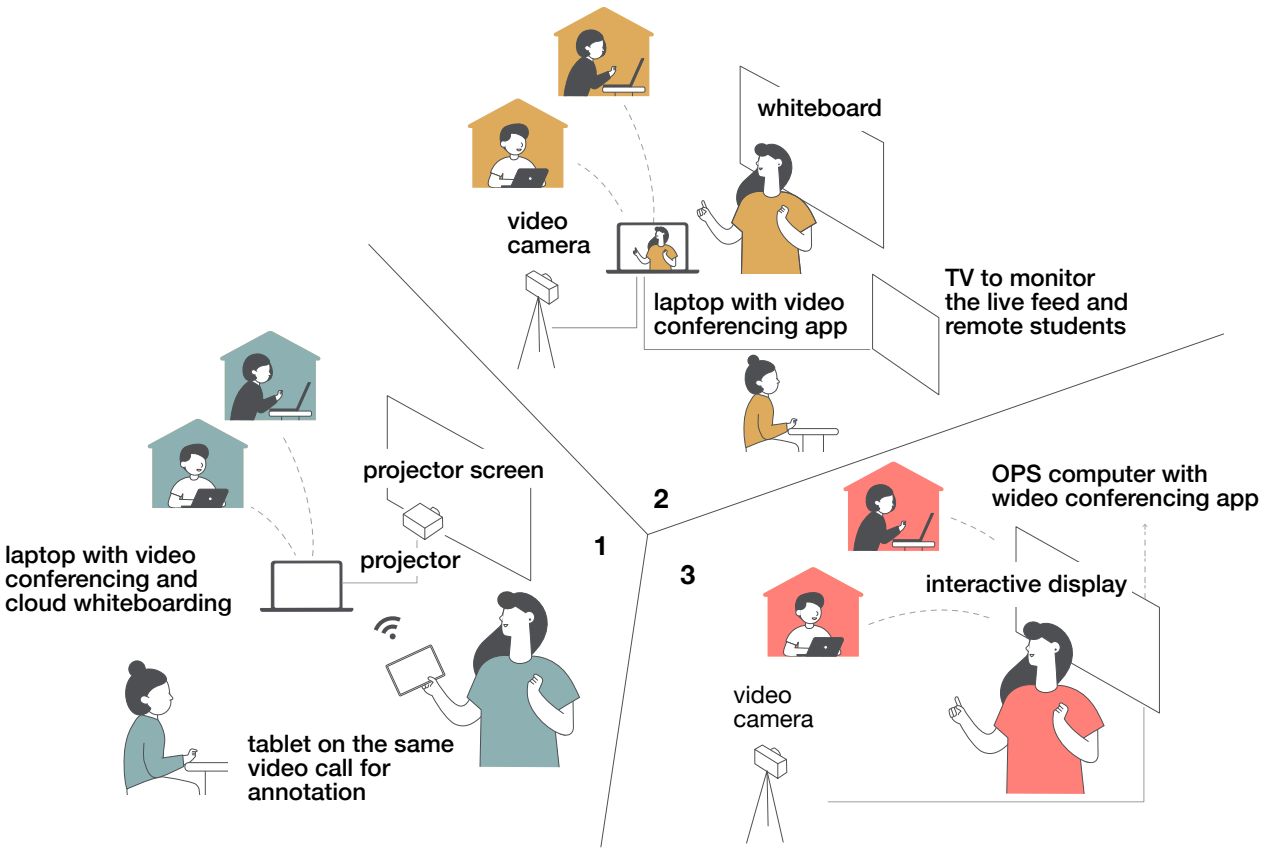
For real-time messaging and asynchronous learning, MIT and Stanford offer tools such as Slack, Piazza, and Jabber, which students and teachers can access from their mobile devices. For synchronous hybrid classes, these universities have their own official Zoom portals. Students only need to log in using their university accounts to join a class. The University of Oxford, on the other hand, encourages the use of Microsoft Teams for online and hybrid learning sessions.

At Caltech, members of the academic community can request to hold Zoom webinars (maximum 3,000 participants) and YouTube Premiere events using the university's official portals, provided that these sessions are duly sanctioned beforehand.

MEETINGS, PRESENTATIONS, AND HYBRID LEARNING

When academic staff or students need to hold small classes, video calls, or presentations, these universities allow them to reserve rooms in advance. These spaces are often fitted with large-format displays and conferencing systems. Teachers and students only need to connect their laptops to extend or mirror their screens for presentations or quickly dial-in using their school-issued access codes to start calls.

For hybrid classes, MIT gives staff the option to configure their rooms to accommodate students who are physically present and those who are joining online. The institute provides hardware like tablets, laptops, projectors, video cameras, TVs, and large-format displays. Below are some scenarios showing how these technologies can be set up.



▲ **Sample hybrid learning setups using available technologies**

LEARNING MANAGEMENT

All five universities use Canvas as part of their overall learning management system. With it, teachers can easily design course modules directly from the LMS portal using its built-in course creation tools. They can also upload existing materials to their course repository. Students can use the LMS to access these modules, take tests, submit schoolwork, and ask for clarifications via their course page. We shall discuss learning management systems and more of their features in the next section.

TECHNOLOGY CHECKLIST FOR FUTUREPROOF CLASSROOMS

Taking from the examples of top-tier universities, we came up with a list of technologies that schools can invest in to enhance the quality of their in-person classes and ensure the continuity of student education by allowing them to swiftly shift to a hybrid learning setup whenever necessary.

INTERNET ACCESS

- ☐ Is there internet access at your school?
- ☐ Is the connection quality adequate for classes?

When creating classrooms that can be used for both in-person and hybrid learning, internet access is non-negotiable.

As of 2019, a reported 99% of K-12 schools in the US already have fiber broadband, granting each of the 46.3 million students and 2.8 million teachers at least 1Mbps of on-campus internet access.[36] Normally, this speed would be sufficient for classes that do not require heavy bandwidth use because it's assumed that not all students or teachers would be using it at the same time. But since hybrid and online forms of learning rely on video conferencing and other cloud-based applications to reach home-based learners and lecturers, schools should reassess if their current bandwidth would be able to withstand a sudden change in demand.

A number of educational institutions have recommended minimum off-campus internet speeds of 1 to 10Mbps for those taking hybrid and online classes. Whether or not schools or local government units should carry the burden of providing adequate internet access to remote students and educators is up for debate.

TOOLS FOR LECTURES AND PRESENTATIONS

- ☐ Is there ample blackboard space for eachers or students to write on?
- ☐ Is there classroom equipment that can be used to:
  - ☐ Access and display materials from the internet?
  - ☐ Present slides?
  - ☐ Play audiovisual content?
  - ☐ Run and display specialized software needed for the lesson?
- ☐ Is there equipment that would allow participants to join lectures remotely?
- ☐ Are there equipment or software teachers can use to record and save their lessons?

Most classrooms in the US are already fitted with a blackboard, accompanied either by a standard projector or non-touch display. These tools are essential since they allow instructors to present topics using prepared visual aids while explaining them in more detail via whiteboarding. For lectures that require continuous annotation, it would be helpful to have cloud whiteboards with expandable writing space.

Classrooms may also benefit from having smart displays or projectors, which have their own operating system and can be used to directly access the internet and communicate with other connected devices. These tools make it simpler for teachers to load cloud-based teaching materials and share them with the rest of the class. Displays that offer wireless screen sharing remove the need for display cables and allow both teachers and students to instantly share their ideas by casting content from their personal devices.

TOOLS FOR VIDEO CONFERENCING AND ONLINE LEARNING

☐ Does your school have a designated video conferencing solution?

For hybrid classes, it's crucial to have high-quality video conferencing and recording equipment in the classroom so that lessons can either be broadcasted live or saved for future viewing.

Although video conferencing has been around since the mid-1960s,[37] its potential as a tool for education wasn't fully realized until the pandemic. Prior to the global lockdowns, schools mostly used video conferencing for business-related and administrative purposes. As this technology is easily scalable (and also the simplest way to connect remote students and teachers), holding classes via services like Google Meet, Skype, or Zoom was the most logical course of action.

It is important for educational institutions to standardize what video conferencing solution to use for classes as this ensures that the experience is uniform for all users. Each of the top universities mentioned in the previous section has its preferred solution. Some have even partnered with service providers, who provisioned dedicated login portals for their schools.

☐ Are teachers and students equipped with adequate video conferencing hardware?

Personal devices like laptops, tablets, and smartphones have built-in cameras, microphones, and speakers that should suffice for one-on-one video calls and mentoring sessions. But for hybrid setups that require students to see what's being written on a whiteboard and hear the ongoing discussions in the classroom, schools should consider either installing high-quality cameras and audio equipment in their classrooms or loaning educators and students these tools when needed.

TOOLS FOR ACTIVE LEARNING AND COLLABORATION

Introducing interactive technologies to the curriculum allows educators to facilitate active learning activities, which are proven to increase the level of student participation in class. These activities help learners acquire essential 21st century skills that would help them perform better when they enter the workforce.[38]

☐ Are there tools that teachers can use to collect real-time student feedback?

For peer critiques and feedback collection, simple student response systems (SRS) and group response systems (GRS) such as clickers or real-time cloud-based surveys and game-based learning platforms like Kahoot! go a long way. By allowing a large group of students to simultaneously give their feedback, it makes it faster for educators to assess the progress of their class.[39]

☐ Do the current classroom tools encourage students to participate actively?

☐ Is there a way for remote participants to collaborate with their peers during class?

Collaborative tools such as cloud whiteboards and interactive displays are also ideal for active learning. These technologies make classes more hands-on, granting students opportunities to immediately practice and demonstrate what they've learned. For example, a teacher can load a diagram on a shared cloud whiteboard and then ask students to build on it. In-person students can annotate directly from the interactive display, while remote students can do so via their personal devices.

According to FutureSource, 25% of classrooms in US schools already have an interactive display to supplement their use of standard projectors. By 2022, we are expected to see a 28% increase in the number of interactive displays installed in schools, as compared to 2020 figures.[40]

LEARNING MANAGEMENT SYSTEMS

☐ Does your school currently have a centralized management system for courses?

Canvas, Moodle, and Google Classroom are just some of the many available learning management systems on the market today. Each of them offers schools a way to organize available teaching resources and distribute them for a more uniform online and hybrid learning experience.

Futuresource forecasts that within the next two years, 66% of schools in the US will already be using a learning management system.[41] This shift may be attributed to the benefits these systems offer, which can be summarized into three aspects: course creation, class management, and communication.

Course creation

Good learning management systems allow educators to design learning modules without too much overhead. These systems should be simple enough to use so that teachers can focus on creating instructional materials rather than wasting time trying to figure out how to navigate the interface.

A quality LMS should also be able to adjust to the instructor's teaching style. It should offer tools that would allow them to create courses, classes, or educational content; or give them the option to upload or link to existing materials, regardless of file format, and use them as they are. For example, a teacher may be able to create an entire module using a set of uploaded slide presentations and then add links to external research materials and videos.

Class management

More sophisticated systems offer teachers a way to view the list of students enrolled in their classes, put them in groups, and manage their access to learning materials and posting privileges. These same lists can be used to track student progress, attendance, and create reports in time for the grading period.

Communication

It is very important to create channels that foster open communication between teachers and students. One of the core strengths of leading LMS providers is how they were able to integrate synchronous and asynchronous communication into their systems.

Some systems have built-in video conferencing capabilities, making it easy for teachers to start live remote lectures or one-on-one consultations. Other systems allow educators to create walls or forums where their students can leave messages, ask for clarifications, or contribute to ongoing discussions asynchronously.

These public discussion boards also serve as live feeds where teachers can post course updates and announcements so that students are always in the know. LMS solutions should also allow students to receive notifications in real time.

OTHER CONSIDERATIONS

☐ Does the technology come with features that protect user health?

Air quality has been a particularly important topic over the last year, with governments worldwide listing school ventilation systems as one of their top areas for improvement. The US administration recently announced that it would provide around USD 100 billion in grants and bonds that would be used for school upgrades, particularly for the enhancement of indoor air quality and ventilation systems.[42]

Since displays will become more common fixtures in classrooms, it's important to consider how the prolonged use of these devices will affect the overall health of students and teachers. There are several solutions with sensors that cover different areas of user health. Some displays, for example, have built-in eye-care technologies that protect users from blue light, glare, and flickering that can cause eye strain and other more serious long-term degenerative eye conditions.

There are also classroom technologies that provide accurate assessments of a classroom's air quality. Depending on how effective their sensors are, some interactive displays are able to give a real-time reading of the CO_2 and particle matter (PM2.5) levels in a classroom.

In the interest of preventing disease transmissions in class, there are also educational tools, such as touchscreen displays, fitted with antimicrobial screens that kill germs upon contact. As the CDC notes, users who share equipment, such as tablets and interactive displays, are more prone to catching diseases by touching contaminated surfaces.[43] Aside from regular cleaning and disinfection, schools can look into acquiring devices with built-in germ-resistant features.

- ☐ Does the technology come with security measures to protect against data theft or prevent data loss?

As with any new device introduced to the school system, these technologies become potential avenues for data theft and loss. Since these systems connect to the internet, attackers may be able to use them as gateways to compromise a school's system. And since some of these devices are used to access school-related data, attackers may also try to abuse vulnerabilities to steal or alter confidential information such as grades and enrolment records.[44] When purchasing hybrid learning technologies, it's advisable to check if they have built-in measures designed for device, network, and cloud security.

- ☐ Is the technology simple enough to use, monitor, and maintain?
- ☐ Does the technology provider extend assistance for training and technical support?

Often, technology investments are not utilized to their maximum potential because their intended users are neither familiar with how to operate them nor able to take advantage of their features. The pandemic exposed just how serious this issue was as several accounts from teachers began to surface during the first few months of hybrid schooling. There were educators who brought up the fact that they were not tech-savvy enough and were forced to learn how to use the technologies rather abruptly.[45,46] Others had raised concerns about running into technical issues and were ill-equipped to troubleshoot them.[47]

These occurrences are fairly common when there is very little preparation involved before introducing new technologies in schools. The transition to hybrid learning during the pandemic was unforeseen and immediate. Moving forward, it would be in the best interest of schools to plan ahead. When selecting which classroom technologies to adopt, educational institutions should consider ease of use, staff training, and remote monitoring and maintenance. As the pandemic showed, it's crucial for IT staff to be able to remotely manage these devices in case it is impossible to fix these issues in person.

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EDUCATION TECHNOLOGIES

Our products are designed with education in mind. From traditional projectors and monitors to interactive technologies, we offer solutions that cater to every need.

EDUCATION EXPERTS

Our experienced staff will work with your school to identify gaps and determine the best way to achieve your academe's goals.

HIGH PERFORMANCE, LOW MAINTENANCE

Our smart interactive devices can be monitored and managed remotely by IT staff to lower the overhead of maintaining your new interactive learning spaces.

READY WHEN YOU NEED US

Whether it's for consultation, technical support, or even staff training, our local offices are ready to help in any way.

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