Reimagining the Future of Learning in the Digital Era

Bridging the Divide in Digital Accessibility and Industry Relevance for New Education Demands and Lifelong Skills Progression

IDC | ANALYZE THE FUTURE

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Executive Summary

The abrupt mass migration into online learning to stem the tide of the COVID-19 outbreak has meant that education digital transformations were launched without proper change management processes and operational best practices. As institutions introduce a phased approach to enable new digital education ecosystems, what is clear is the need for a proper, well-coordinated, and structured approach to ensure digital accessibility, curated content quality, enhanced student learning experiences, and school educator or administrator support at all levels, from pre-K-12s to tertiary institutions. This is necessary for education institutions to achieve consistent and better outcome-based performance indicators before returning to pre-COVID days.

As schools strive to stay ahead of the curve, especially tertiary institutions that pride themselves on maintaining their regional and global competitiveness, their current and future digital strategies will be critical. Those that consider the needs of students and educators as well as parents — in the context of preparing for the future workforce — will have a distinct advantage.

The role of IT and the range of transformative technologies are now more important than ever as schools look to a new paradigm of provisioning quality education, in which digital one-on-one personalized teaching is complemented by students learning via digital tools, supplementary education ecosystems, and online media.

This IDC InfoBrief looks at the urgent call for a rethink of not just how students are taught but how educators themselves can be ready for the new educational challenges beyond the horizon.

The Asia Pacific Education Landscape Next Normal

Envisioning the future requires governments, education institutions, and all parties in the student learning value chain to confront several challenges.

Protection against health risks Amid gradual return to normalcy

With no vaccine in sight for at least two years, getting UNESCO's estimated world's student population back to school means protecting the health of some 1.5 billion pre-K-12s to tertiary learners while ensuring their learning continues. As restrictions ease, it remains a tricky balance between returning to pre-COVID school days and keeping students out of the sick bay.

A focus on digital learning ecosystem wellness for students, parents, and caregivers

Recognizing that the readiness of education ecosystems for distance learning is highly varied by geography, family income, and age group of the student is critical. The reality is also that not all national environments, and homes, are equipped to meet the needs for digital learning. This calls for education institutions to provide assistance to parents and caregivers in areas such as imparting knowledge, providing technical support, and even offering psychological aid.

Schools as anchor for Social communities in limbo

The loss of a school community goes beyond academic subjects. The question of the future of extracurriculars like sports, music, clubs, social gathering, and milestone events remain to be answered.

Keeping everyone informed to better navigate the new future of learning

Few education institutions have had time to look into implementing home-based online learning and determining how these services should be managed and integrated into their curriculum. Questions around platforms, processes, and policies require institutions to create one-stop portals that provide vital informational support to empower and assist teachers and students, as well as parents who play a critical role in their children's academic success. A one-stop portal supports one on a self-discovery journey, as well as to make informed education and career choices, with students being guided by both their parents and teachers.

Not all learning experiences can be achieved through virtualized, online environments

While online learning platforms have provided an alternative, practical courses such as engineering as well as medical and science research require specialized equipment and for both teaching and learning individuals to be present physically at special facilities, such as psychology labs and architecture studios. Digital simulations and instruction can help meet some learning objectives, but they still miss the mark on giving students the hands-on, practical experiences.

Survivability of private and Supplementary education schools

Private tutors and enrichment education providers (e.g., music, arts, and digital content) face challenges of their own as they strive to stay operational via online platforms and economically viable in the wake of brewing financial challenges due to prolonged national closures.

Future Education on Smaller Budgets

Today's educational institutions are confronted to rethink their future strategies for digital transformation. Competition in online education, high-profile digital transformation failures, a lack of innovation commitments, elusive ROI accountability, and ever-changing technology use cases mean institutions will have to develop a vision for more agile digital services supported by sustainable IT.

Amid the uncertainties and disruption, the six education challenges outlined in the previous page push the new education imperative away from digital for the sake of innovation but digital for the sake of future education. Digital, where it matters, is about addressing the future of leadership, work, intelligence, operations, as well as student attraction and retention which will determine the relevance and survival of institutions.

Cautious optimism amid harsh reality

The reality is that online learning may widen the educational gap further, and the need for home-based learning has thrown another spanner in the works.

The fundamental role of technology raises issues of access and equity, particularly for underfunded education systems. There is the issue of students lacking stable internet connectivity and at-home devices to access services. The needs of students who do not have home support for structured learning, including children with special needs, also need attention.

Digital equity issues mean that accessibility depends on the ability of a family, or of an education system, to provide access to families in need. This includes accessibility to productivity-tools-enabled devices (e.g., video conferencing equipment and content development software). Those in emerging economies remain of the highest digitally-displaced populations.

Budget cuts

Education systems require financial resources, an area that is set to decrease. According to IDC's research, 28% of Asia Pacific education respondent organizations expect their budgets to fall by 10%-20% while 22% expect a bigger drop of 20%-49%.
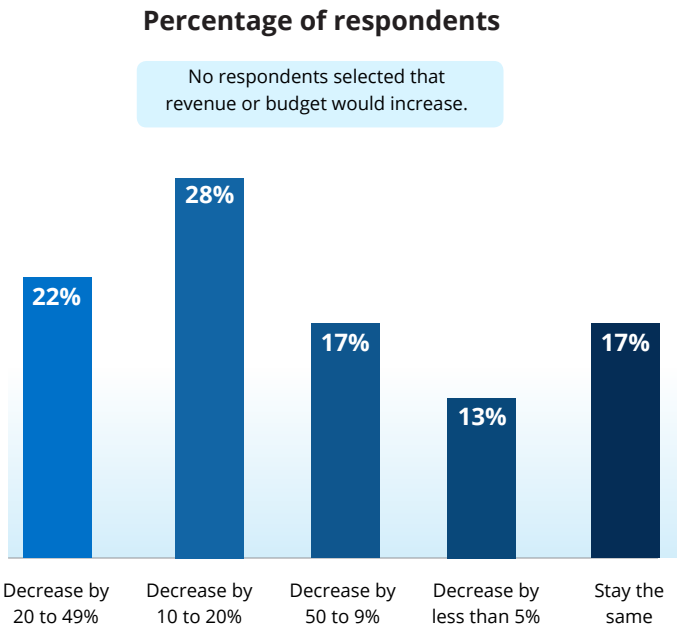
Q: Which of the following best reflects your expectation for the control of COVID-19?

Percentage of respondents

- 12%
- 21%
- 67%
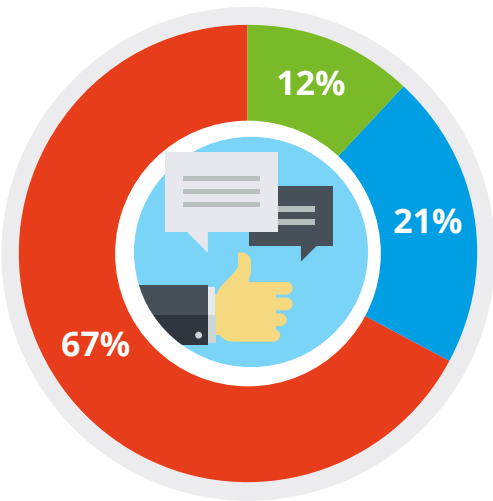
■ Very Optimistic, will soon be under control
■ Cautiously optimistic, will come under control but take longer
■ Pessimistic, will be very difficult to control

Q: What impact do you think COVID-19 will have on your organization's revenue/budget in 2020?

Percentage of respondents

No respondents selected that revenue or budget would increase.

Decrease by 20 to 49%	Decrease by 10 to 20%	Decrease by 50 to 9%	Decrease by less than 5%	Stay the same
22%	28%	17%	13%	17%

Crisis Pushes Innovation and New Business Models to the Fore

Amid the global pandemic, the importance of digital innovation is not just about delivering education and mitigating health risks but building resilience in the education sector to meet the needs of the future workforce.

? **Q: In order to address the challenges that arise as a result of COVID-19, which of these digital transformation (DX) areas should your organization be focusing on?**

Category	Percentage
Strengthen software capabilities for digital innovation	35%
Explore new business models/growth areas	32%
Create a new remote office and enterprise collaboration system	31%
Invest in IT/cyber security to build digital trust	30%
Mine information and data to achieve insights at scale	29%
Improve working environment to attract and retain talent	24%
Customer-centric processes/customer experience	23%
Explore use cases for 5G and the Internet of Things	22%
Creating a competitive digital culture and organization	21%
Improve efficiency and reduce costs by optimizing operations	20%

Percentage of respondents

Accelerated Education for the Digital Age

5G Learning Space Transformation

15%

By 2024, 5G will transform 15% of classrooms, with more immersive lessons and real-time feedback, swift access to content and content creation, and more out-of-classroom learning
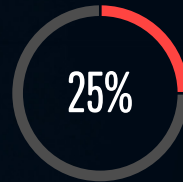
Rapid, Forced Adoption of Online and Distance Learning

WorkForce of the Future

50%

By 2020, 50% of governments will address skill-set shortages due to DX through digital curriculum emphasis in K-12 and tertiary levels, and through lifelong learning initiatives for existing workforce
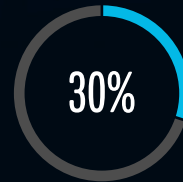
Rethinking Remote and Telework

Digital Teacher-Parent/ Student

25%

By 2022, 25% of education institutions worldwide will invest in teacher-parent and teacher-student portals to manage "out-of-classroom" interactions and engagements, notably at pre-university levels
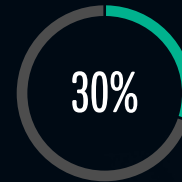
Deployment of Multi-Faceted Communication Tools

School By Design

30%

By 2022, 30% of tertiary schools will deploy automated digital school master scheduling systems to reduce class scheduling errors to cope with admin inefficiencies and increasing operational burdens
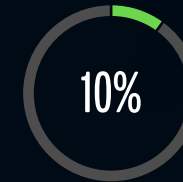
Agile Campus Operations

Digital Payments and Grants Management

30%

By 2022, 30% of tertiary institutions will enable end-to-end cashless payments across a wide range of goods and services, including tuition fees, elearning, merchandise, and donations
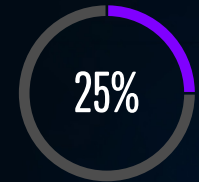
Virtual Recruitment, Admissions, and Enrolment

Digital ID and Data Security

10%

By 2022, 10% of student digital IDs will include blockchain to improve campus-wide physical access security and online verification and access to student administrative, academic, and medical records

Security and Privacy

5G Research Hubs

25%

By 2020, 25% of higher education institutions will invest in 5G innovation hubs to test the usability and commercial viability of emerging technologies and create training programs with "live" demo studios

Outcomes-Based Value-Creation

COVID-19 Scenario Planning

IDC outlines three virus infection trajectory curves that will impact policies.

Upwards Trajectory

▶ Prevention and control measures beginning to be put in place, including extended school holidays and school closures.

▶ Critical milestones are delayed such as course curriculum, key examinations (e.g., GCE Ordinary and Advanced Levels, SAT, and International Baccalaureate), and social milestones such as graduations.

▶ Extra-curricular activities are halted leading to possible impact on financial aid or scholarships, and supply chains (e.g., musical instruments).

▶ Teachers and administrators are in crisis mode to rapidly learn and deploy new virtual and remote offerings.

Peak Infections

▶ Prevention and control measures are more strictly enforced, with school closures extended possibly until the end of the academic year.

▶ Critical milestones are missed, such as course curriculum, key examinations (e.g., GCE Ordinary and Advanced Levels, SAT, and International Baccalaureate), and social milestones such as graduations, leading to questions over next year's class preparedness.

▶ Extra-curricular activities (e.g., music and athletics) are cancelled for the academic year, affecting supplementary education businesses and student progress.

▶ A routine is established for distance learning and communications, with plans for students to catch up in the next academic year.

Flattened Curve

▶ Students return to school, or are kept in schools for continued monitoring; improved contact tracing is implemented.

▶ Critical milestones must be re-visited to assess student readiness to learn new content, take key examinations; planning is in place for social milestones, though some will be permanently cancelled.

▶ Extra-curricular activities are back in place, with varying levels of returning students; catch up is required.

▶ Institutions look to what's next, including managing a resurgence in COVID-19 cases, new spending considerations based on lessons learned, and how digital transformation can be continued.

Sources: IDC FutureScape: Worldwide Education 2019 Top 10 Predictions
IDC FutureScape: Worldwide Education 2020 Predictions

The Role of Technology in Driving the Future of Education

Amid the uncertainties and anticipated drop in revenues due to shuttered economies, bracing for the future calls on the education sector to rise to the challenge of building on programs that will scale to bring maximum impact to students and tools for more effective teaching.

Business Continuity
- Managing digital equity for students
- Implementing network and collaboration tools tor staff
- Rapid rollout of online content

ROI Focus
- Daily (in some cases hourly) communications with parents, students, and staff
- Fast teacher and faculty upskilling
- Closure of campus tours, events, sports, labs, and libraries

Operational Resiliency
- Rapid stakeholder communications
- Budget and project restructuring
- Analysis of data for the path forward

Acceleration
- New content and learning platforms
- Continuous teacher and staff Upskilling
- Exploring digital innovation, beginning with virtual tours and admission process

Innovation
- Adopting device and connectivity as a service
- A focus on content management and agile development
- Future of workforce planning with COVID-19 management

1 Crisis	2 Slow down	3 Recession	4 Investment	5 Recovery

Impact of COVID-19 on K-12 Institutions

Here is a snapshot of how COVID-19 has impacted technology spend and adoption differently.

Immediate Wins

- Remote learning
- Digital classroom tools
- Mobility solutions — devices and device management
- Learning management systems/curriculum management systems/content platforms/learning CRM automation tools
- VOIP, videoconferencing and other telephony solutions
- Public communication platforms — unified communications & collaboration tools
- Communication platforms — portals and self-service
- Student admissions/administration systems
- Cybersecurity, Digital ID, and network security tools
- Blockchain
- Cloud services (SaaS and PaaS)
- AI and analytics
- New ICT Infrastructures (e.g., 5G/WIFI6)
- Digital skills programs for administrative and teaching staff
- Remote IT support services

Longer-Term Priorities

- Classroom peripherals
- BYOD platforms
- AR/VR
- School asset management
- Consolidation of hardware and software operating expenses
- In-house innovative software developments or pilot investments
- Costly supplementary software licenses
- Campus physical security solutions (e.g., CCTV)
- Campus sensors and IoT solutions

Impact of COVID-19 on Tertiary Institutions

Here is a snapshot of how COVID-19 has impacted technology spend and adoption differently.

Immediate Wins

- Remote Learning
- Mobility solutions — devices and device management
- VOIP, videoconferencing, and other telephony solutions
- Public communication platforms — unified communications & collaboration Tools
- Communication platforms — portals, self-service Learning management systems/curriculum management systems/content
- Platforms/learning CRM automation tools
- Student admissions/administration/hostel operations management systems
- Digital library systems
- Cybersecurity, digital ID, and network security tools
- Blockchain
- Cloud services (SaaS and PaaS)
- AI and analytics
- New infrastructure (e.g., 5G/WIFI6)
- Assessment management and online proctoring systems
- Financing and grants management systems
- Digital skills programs for administrative and teaching staff
- Remote IT support services

Longer-Term Priorities

- Classroom peripherals
- BYOD platforms
- Major addition or expansion of existing ICT facilities (e.g. new data centers, enterprise network solutions, and CCTV infrastructures, etc. for new faculty/ departments and/or new research centers)
- Smart buildings
- Campus asset management
- Task process automation
- Costly ERP and large back-end upgrades
- Costly high-performance computing initiatives
- In-house innovative software developments or pilot investments
- Costly supplementary software licenses
- Campus physical security solutions (e.g., CCTV)
- Campus sensors and IoT solutions

Japan

Overview

Japan spends 2.9% of its GDP on education, one of lowest among 35 OECD countries.[1] The student-per-computer ratio is low.
Only 1 computer for every 5.4 students in public elementary and junior high schools. There is still a large digital divide in the nation in terms of accessibility, and cultural challenges continue to hinder the widespread adoption of online learning.

Impact of COVID-19

▶ During the three-month COVID-19 school closure, few education prefecture and districts authorities were able to give out computers or tablets for home-based learning. Instead, students and parents were called back physically to schools, before and during the closure, to collect new textbooks and assignments for the break — all in the form of paper-based materials.

▶ Online learning has accentuated the class divide, with disparities between well-funded private schools and poor public schools. Unlike their peers in public schools that do not have the benefit of supportive corporate sponsors or well-endowed, accomplished alumni donations, students in better resourced schools have easy access to comprehensive online educational services and a range of personal devices to facilitate remote learning.

Policy attitudes to open standards

▶ In 2018, Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) announced a value-based approach to education technology and "open innovation".[2]

▶ The ability to be "flexible" and "innovative" requires an openness to various operational systems, standards, knowledge and experiences. This means that the concern of the OS of the IT device does not matter (i.e., Chrome, Windows, iOS, or Android) as much as the ability of the different OS/devices to help achieve specific outcomes faster (e.g., enhanced experiences, increased automation, faster processing time, and more intuitive interface).

GIGA school impact

▶ In December 2019, the government set aside US$2.15 billion to be allocated under the Global Innovation Gateway for All (GIGA) to ramp up the deployment of essential ICT infrastructures in schools, and for every student to have access to a computer, as well as internet or mobile connectivity over a period of four years.

▶ Based on IDC's 3rd Platform Technology spending research, Japan's education sector is expected to spend US$471,188 in FY2020 with a 5-year, 2018-2023 compound annual growth rate (CAGR) of 9.4%, highlighting strong growth forecasted due to the GIGA school funding initiative.[3]

▶ "One School Project", part of the "Manabi Pocket" initiative, a cloud-based education platform provided by NTT Com, reported about 300,000 registrations as at the end of April 2020. This cloud-based education ecosystem was created to capture education content (i.e., videos and learning materials) provided by local governments and schools nationwide, and to be easily accessible to students and parents nationwide as part of the goal to enable online learning in Japan.
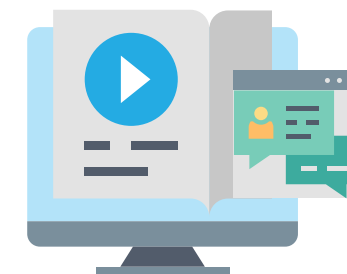
[1] Source: OECD's Education at a Glance 2019
[2] Source: White Paper on Science and Technology 2018, "Accelerating Open Innovation — Toward Sustainable Innovation Co-created by Industry, Academia, and Government Provisional Translation)"
[3] Source: Japan 3rd Platform Forecast Update by Vertical Segment and Company Size, 2019–2023

Australia and New Zealand

Overview

Technology plays a big role in Australia and New Zealand's education sector. Cloud computing, collaboration tools, and new workplace models implemented prior to the outbreak have enabled a swift adaptation to remote working and online education, in a way that would have not been possible five years ago.

The Digital Technologies Hub, initiated by Australia's Department of Education, is an online portal that offers digital learning resources to help teachers and students enhance their skills in digital technologies.

New Zealand's digital readiness program is designed to help teachers and education leaders get acquainted with digital technologies, including teaching strategies, explanatory videos, train as digital leaders, and networking opportunities to explore new ideas.

Impact of COVID-19

▶ The shift to remote working and online education saw a surge in demand for portable devices and computer equipment, a move that will close the digital divide.

▶ With the majority of students working from home, the New South Wales Department of Education moved quickly to help bridge the digital divide. The ministry announced a program to provide thousands of laptops and Wi-Fi modems on loan to students in need. This includes providing both education and support (e.g., well-being and mental health) for parents and caregivers.

▶ Short-term demand for tablets and laptops has increased as schools adopt online learning, but over the long run, shortages in supply may impact accessibility to these mobility devices as manufacturing plants globally have halted operations temporarily to deal with COVID-19 operational lockdowns.

▶ COVID-19 is the catalyst for the shift towards working from home and online education. Educational bodies realize that they can still be effective via remote working and online learning practices.

▶ Education institutions are likely to face constraints around deploying infrastructure on-premises, which will contribute to more workloads to the cloud. Accelerated adoption of the cloud will put pressure on infrastructure as a service (IaaS) providers to ensure they hold the capacity to deliver to increased market demands.

Online education is reshaping IT education and training

IT education and training is often the first casualty of any economic crisis as business seek to cut back on costs. While this will also occur in 2020, the industry must quickly move training to digital and online platforms.

▶ IT service providers and vendors have created online training tools to support remote workforces, providing customers with the opportunity to upskill workers affected by the lockdown.

▶ Most of the courses are being provided as an initiative to support the community's well-being. These courses are available for any individual and are available as a complementary service or at a massively reduced rate. The concession rates will put pressures which are likely to remain flat or even decline.

Secure remote working and learning a priority

▶ The sudden and massive shift to remote working has raised the alert on cybersecurity.

▶ The Australian Cyber Security Centre has identified several cybersecurity issues, prompting education institutions to seek security solutions.

▶ The security issues related to mobility include mobile device management, shadow IT given the ease of downloading free applications, increased adoption of unvetted collaborations tools, VPNs, data security, and end-point encryption.

India

Overview

Collaboration tools, security, mobility solutions, cloud and hosting services are witnessing a short-term rise in demand to support remote working and learners. Among the key requirements are the need for enhanced bandwidth, speed, and connectivity along with a digital omni-channel experience for the education ecosystem.

An ICT curriculum for teachers and students has been developed by the National Council for Educational Research and Training (NCERT) to teach students digital learning (i.e., using technology while learning), as well as to integrate ICT in their teaching.

Impact of COVID-19

- Like the rest of its Asia neighbors, the India government closed its schools and turned to digital education.

- In India, COVID-19 school closures have affected 320 million students, and while the government has subsequently proposed moving to "internet education," this ignores India 's enormous digital divide, especially around gender and class divisions.

- The latest 2017-18 National Sample Survey revealed that only 23.8% of Indian households have Internet access. Rural households, which make up 66% of the population, continue to lag behind, as only 14.9% have Internet access compared to 42% in urban households.

- Only a small percentage of K-12 students have access to smartphones, and notably, most teachers are not skilled sufficiently to conduct online learning.

Education technology to play a bigger role

- Banking on the education technology private industry to deliver greater national equity for digital access and learning outcomes.

- Education technology is being used to deliver high-quality lessons in a variety of formats, such as, text, video, games, and interactive tutorials.

- A well-made video can leverage the very best teachers and support them with interactive graphics and animations to enhance learning. Once this video is prepared, it can potentially be watched by millions of students. The video can be supplemented with interactive quizzes that give the student immediate feedback.

- The ability to tailor lessons according to a student's abilities offers a great advantage, which ultimately will supplement teachers towards more precise 1-on-1 personalized coaching.

- Behavioral interventions delivered by technologies such as text messages (e.g., SMS), which are typically low in cost, make them ideal for a low-budget school administrative system. An example is automated text messages to parents about their child's performance were anecdotally found to increase both attendance and exam performance.

- With over 260 million students, India's large cost-effective software industry and its comparatively decent telecom infrastructure will play a critical role in helping the nation's education industry to transform digitally.
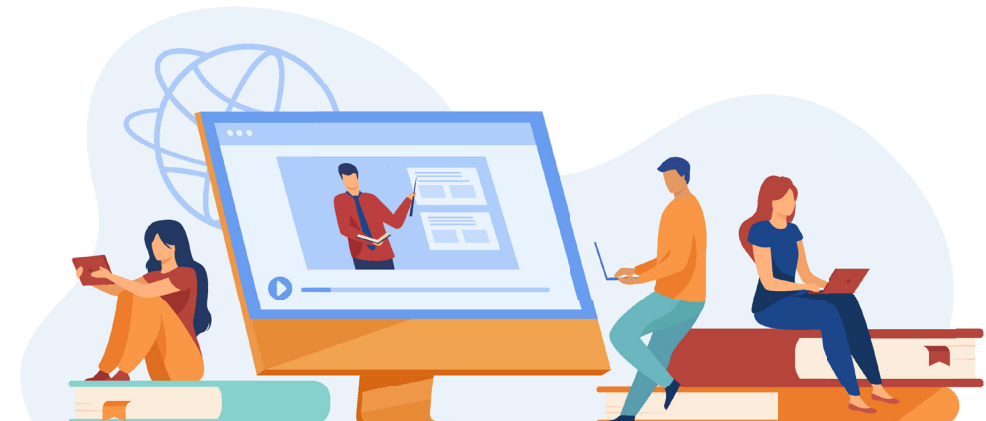
ASEAN Markets

Overview

Education underpins the growth of the ASEAN community, building a knowledge-based society and contributing to enhancing the region's competitiveness.

ASEAN also sees education as a tool for increasing awareness of its markets, encouraging the "we feel" and creating a sense of belonging to the huge diversity within the ASEAN community and an appreciation of the richness of ASEAN's history, languages, culture, and common values.

Impact of COVID-19

▶ ASEAN's education sector, whether pre-K-12, K-12 and tertiary, have embraced digital and online learning initiatives to continually stay in touch and educate students remotely, while at the same time ensuring that the content they are creating will lead to more realistic, industry-ready skills transference and accreditation.

Indonesia

A national strategic plan

The strategic plan still needs to be expanded and intensified regarding the use of ICT, particularly as a curriculum material and as a medium in the interactive learning process. As a curriculum material, ICT is part of the Education Unit Level Curriculum (KTSP), which made it a compulsory subject in schools. However, there is a lack of implementation because of the current ICT infrastructure.

Malaysia

Higher learning initiatives

Islamic International University Malaysia (IIUM) and Universiti Tunku Abdul Rahman have jointly developed the Premier digital tech Institutions Initiative under the Ministry of Education and the Malaysia Digital Economy Corporation (MDEC) to provide students with proper training about digital technologies, moving toward ICT workforce development by enhancing the student's technical skills.

Thailand

Online learning by start-ups

Instead of transforming the existing education system, Thailand is looking to disrupt it by creating an education innovation ecosystem pushed by technology created by education technology start-ups. During the nationwide COVID-19 lockdown, the Office of Private Education Commission (Opec) developed an online learning platform through its Digital Learning Centre to provide education to the general public through internet connections and to all elementary and secondary students nationwide.

Philippines

Support for basic education

The National Program Support for Basic Education (NPSBE) project supports the government's Basic Education Sector Reform Agenda (BESRA) that was designed to help improve the quality and equity of basic education in the Philippines. This will help Filipinos access the right for basic education, particularly those who are economically backward.

Singapore

Online learning platform for compulsory learning levels

An online learning platform known as the Singapore Student Learning Space (SLS) is made available to the students as part of the Ministry of Education's (MOE) commitment to nurture future-ready learners. The SLS is an online platform for all students to learn at their own pace and collaboratively, with tools and curriculum-aligned resources. Students can take greater ownership of their learning with the SLS and acquire skills and habits to prepare them for lifelong learning. Teachers can also use the SLS to support the teaching and learning in the classroom.

Emphasis on skills upgrading

The nation's SkillsFuture series of training programs was launched in 2018 for industrial employees to enhance and upgrade their knowledge and skills by offering proper training courses to train them. These introduced programs focused on emerging skills areas and drew reference from the Industry Transformation Maps (ITMs).

North Asia Markets

Overview

Taking an outcomes-based approach to technology investments, North Asia governments are investing in the rapid and effective delivery of care. Investments emphasize the strategic use of ICT, where accessibility is the first goal, especially to enable distance learning and telework within rural communities in several states.

Impact of COVID-19

▶ There is wide deployment of ICT for rapid, large-scale social orchestration such as regionwide temperature scanning and swab testing, contact tracing, population management and an open approach to information sharing and dissemination.

▶ There has also been a focus on strengthening the governments' credibility and trust through coordinate communications. This includes the compilation of data from two different sources — the immigration and customs database and the regional insurance database — started to create a single big data analytics framework.

▶ These markets were able to successfully classify cases based on clinical visits, travel background, and symptom trends to provide real-time warnings about potentially infected persons to targeted population segments.

Hong Kong

Digital education as a norm

The Education Bureau (EDB) through the "Fourth Strategy on IT in Education" is leveraging online education resources as a means to enhance learning and teaching effectiveness, classroom interactions, and the students' ability in self-directed learning, problem-solving, and collaboration — all through their personal mobile computing devices. In light of COVID-19, many schools have leveraged elearning platforms as a curriculum norm, with EDB providing subsidies of up to US$600 per student to procure their own mobile computing device, install a mobile device management system on the device, basic computing accessories, and 3-years' warranty support.

South Korea

ICT-based pilot classrooms

ICT-based classrooms will be built for primary and secondary schools following elearning consulting. These classrooms will be equipped with different hardware and its supported software, enabling ICT-integrated lectures and supporting teacher training, teaching methods, and curriculum development.

Taiwan

Smart classrooms

Four main areas of development by Taiwan's Digital Education Institute (DEI)

Smart classroom — uses state-of-the-art image recognition technology to analyze the general sentiments and learning capabilities students in a classroom.

Education material production space — to produce high quality educational materials for the students.

**Advanced smart sensors** — uses brainwave sensors to measure student alertness.

Virtual reality — to bring classrooms to life by catching the attention of students through better engagement and enhanced learning.
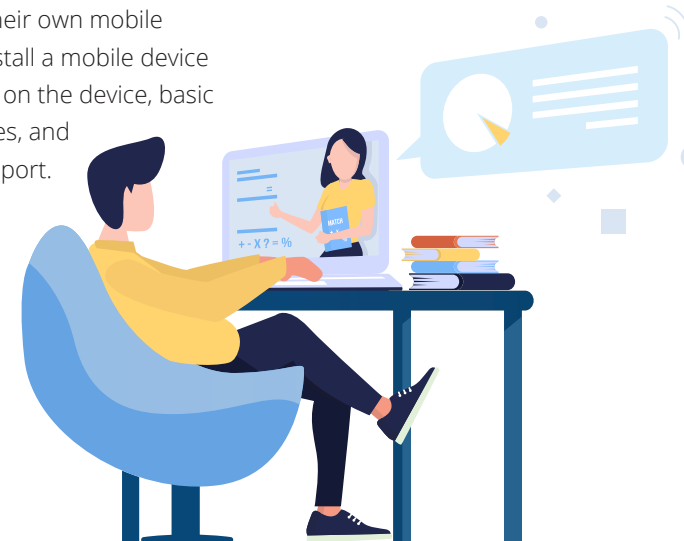
Preparing for the Future in Education

New technologies will need to be considered as part of the next normal to monitor student health, use contact tracing to limit spread, and enforce social distancing and quarantines.

New technologies that are being explored include:

Test » **Trace** » **Isolate** » **Quarantine**
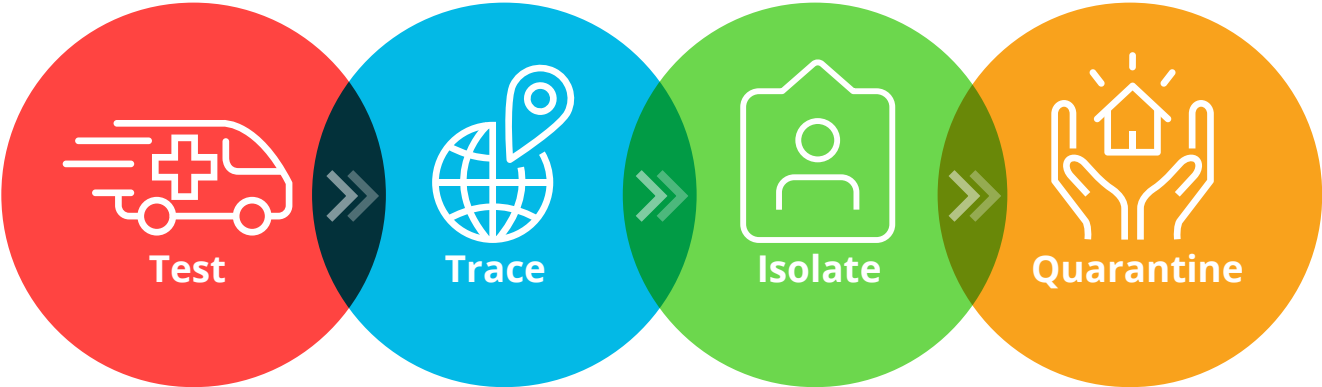
Thermal scanning at entryways

Outbreak risk management protocols and policies, especially key for schools that house students are will be responsible for their quarantine and care if an outbreak occurs.

Special education services from a distance

Wearables for reminding to keep social distance

Scaffolding for next grade levels, where do they start for their curriculum given work missed?

Virtual or robotic replacements for sports, music, art and other essential cultural activities

Mobile apps that track encounters for contact tracing

Ongoing equity planning in face of ongoing needs

Radically different schedules and school logistics to stagger work hours and shifts, limit the density of students in classrooms and other spaces, and move seamlessly from online to onsite learning, using both instructor-led and self-paced tools.

IDC Essential Guidance

The future of education will be a mix of onsite and distance learning, using online tools that support both models. With COVID-19, the possibility of multiple phases of closing and re-opening means that schools will have to be much more agile switching from one mode to another. Cloud computing will be essential to enable this Institutions must take time to collect data on the recent

Institutions must take time to collect data on the recent experiences of staff, faculty, parents, students and alumni to assess successes and challenges. What content changes are needed as learning shifts from in-person to online? What infrastructure upgrades may be needed? How have student expectations changed?

Be very careful in cutting funding for IT and technology in the context of budget and revenue declines. Technology is the enabler of the agility to respond to the pandemic. Not only does it support remote work and distance learning, it will be required for social distancing, contract tracing and other monitoring that will be needed as schools re-open

Understand the art of the possible. Digital innovation not only will support the "Next Normal" (e.g. apps that help with contract tracing or AI for online proctoring tools) but help schools differentiate themselves. This will be key for higher education to attract and retain students and enable new processes for the entire student lifecycle from recruitment to alumni relations

Establish a structured approach for remote learning platforms. Prioritize on distance learning as students, particularly in K-12 and universities, look for a newly defined educational experience through online (rewrite content to fit 'edited' bold texts)

Focus on learning management. Focus and adopt flipped classrooms where students get edited lecture videos prior to the class. Such contents in cloud give enormous flexibility to the learning process. This will redefine the role of the educator in educating future generations

Enhance collaboration. Adoption of technologies and subsequent customization should not lead to siloed way to the whole learning process. It is the responsibility of the institutions to encourage collaboration between the student peer groups, routing technology as an enabler

Train the trainers. Training the teachers to make them merge with the digital platform must be of paramount importance as they control the entire process, once adopted. Once teachers take the 'ownership' of the system or implemented model, it will hit the targeted outcome

Delivering a future-ready education experience for all.

Change is a constant. It is important for schools to proactively adapt to a world where learning happens anywhere and everywhere with solutions that are designed for everything today's teachers and students need. Lenovo can help schools ensure that learning never stops, with dependable, durable hardware, intuitive software, and innovative solutions for all kinds of learners.

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