

EDTECH SURGE: COVID-19 AND BEYOND — TOWARD A PARADIGM SHIFT IN LEARNING —

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SUMMARY

- The essence of EdTech's roles and functions in society lies in its ability to drastically improve access to learning, and to provide individually optimized learning programs and content for learners to learn most efficiently.
- Amid the coronavirus pandemic, the utilization of EdTech is expected to increase in public education, particularly in countries and regions with limited resources, and also in vocational education, in response to the increased global need for upskilling and reskilling.
- As a result, across the world, the mainstream of public education is shifting from group learning to personalized learning optimized to each individual, and vocational education is moving toward modular and lifelong learning. A paradigm shift in *learning* in these two aspects may possibly occur.

According to UNESCO, the closure of schools caused by the spread of the COVID-19 infections affected over 1.5 billion students worldwide at the peak in April 2020. With an increase in the number of people whose educations were interrupted, it is believed that there will be a slowdown in the growth of the education market as a whole. However, EdTech is expected to grow at a rate greater than anticipated before the coronavirus pandemic came along due to the sudden emergence of needs for online education. The EdTech market has even been forecast to grow at an average rate of 14.5% to 16.4% per year until 2025, accounting for 5% to 6% of the overall education market at USD 400 billion worth.¹

EdTech (abbreviation of Educational Technology) refers to not only online education, but also a variety of learning tools and services leveraging digital technologies such as artificial intelligence (AI), and virtual and augmented reality (VR/AR). This article reviews the current state of this industry and discusses the future developments in fields such as primary and secondary education (public education, hereafter) and vocational education, including technical colleges, universities, and corporate training where EdTech is to prevail further.

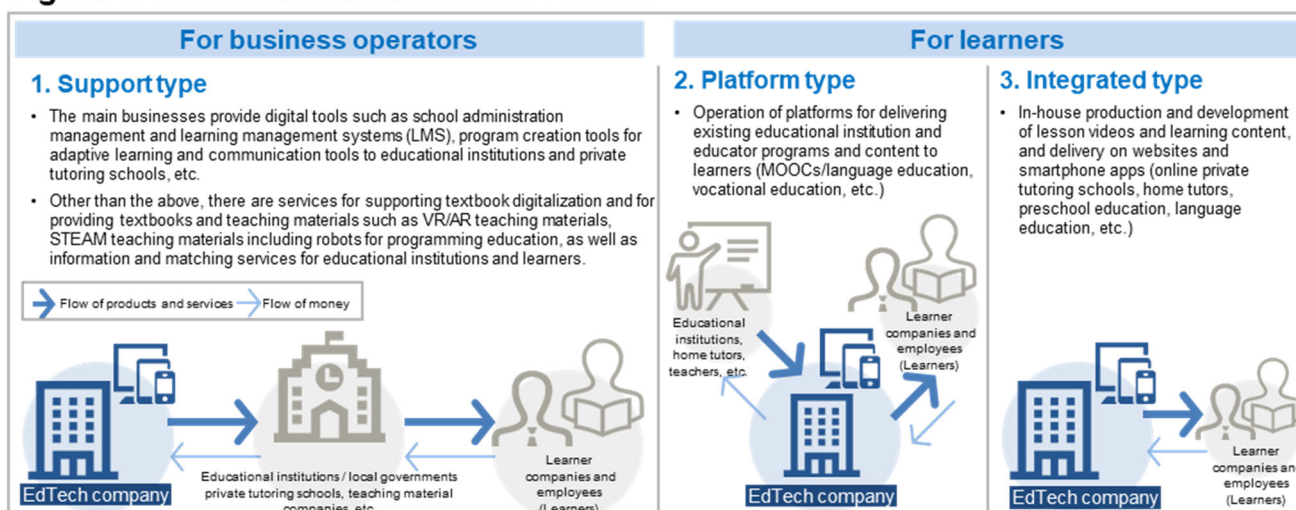
1. CURRENT STATE OF THE EDTECH INDUSTRY

Main business models and characteristics of growing companies

EdTech refers to a variety of tools and services leveraging digital technology. To sum up its roles and functions in society, the essence of EdTech lies in its ability to drastically improve access to learning in terms of time, place, and cost, and to individually optimize content and curriculum by accumulating and analyzing learning data.

The business models for providing EdTech can be generally categorized into support for business operators (Figure 1-1), platform for learners (Figures 1-2), and integrated type for learners (Figure 1-3).

¹ See Global EdTech Report 2020, IBIS Capital/ Cairnagle Associates.

Figure 1. Main Business Models in EdTech

Source: Created by MGSSI

Of these, the first to emerge was support for business operators, and companies providing such support are growing mainly in developed countries with the established presence of educational institutions and private tutoring schools (Figure 2-1). Typical support products and services are Learning Management Systems (LMS), which are provided not only to schools or private tutoring schools, but also to enterprises for internal training. This tool, which centrally manages curricula, learning progress, and test results, is recently available on a cloud basis and has become comprehensive through such as unification with live streaming of classes and sharing tools for communication.

The business model of platforms for learners is also growing mainly in developed countries where educational institutions are already established. Companies providing services called Massive Open Online Courses (MOOCs) are showing particular growth (Figure 2-2). MOOCs are courses aimed at an unspecified number of participants on platforms, where a variety of learning programs are provided, partnered with such as universities and instructors.

In contrast, companies providing integrated services from content development to delivery are growing significantly in emerging countries (Figure 2-3). These services are focused on the field of supplementary learning, capturing learners in areas with a shortage of conventional private tutoring schools and home tutors. TAL Education, the largest of the world's educational companies in market capitalization, is growing with the operation of private tutoring schools incorporating EdTech, as well as sites and learning apps delivering online lessons.

The growth of start-ups is prominent in China, where several unicorn companies have emerged. In 2020, Yuanfudao came into the spotlight with its over 400 million total users, and ownloads of its learning app ranked top in the education category in China from January to mid-March 2020. While venture capital investment has been sluggish, Yuanfudao received USD 1 billion in funding from investors such as Tencent and US-based IDG Capital, bringing its corporate value to USD 7.8 billion.

In India as well, some companies have grown to be valued at over USD 10 billion. BYJU'S, which boasts 3 million paying users, raised USD 420 million in funding in 2020 in recognition of videos using animation and 3D images to attract children mainly in subjects of science and mathematics, and learning programs optimized to individuals. In addition to BYJU'S, several other start-up companies have also succeeded in obtaining funding during the coronavirus pandemic.

Figure 2. Main EdTech Companies**1. Support type**

	Head office location	Company name	Established	Target	Corporate value ^{*1} (USD billion)	Total funding (USD million)
Listed companies	US	Blackboard ^{*2}	1997	All courses	-	122
	US	2U	2008	Higher education	2.6	427
	US	K12	2000	K-12 ^{*3}	1.4	20
	US	Chegg ^{*4}	2005	Higher education	8.4	252
Start-ups (Unicorn companies)	Canada	ApplyBoard	2015	Higher education	1.4	126

2. Platform type

Start-ups (Unicorn companies)	US	Coursera	2011	Higher and vocational education (MOOCs)	2.6	443
	US	Udemy	2010		2.0	223
	US	Udacity	2011		1.1	105
	US	Guild Education	2015	Vocational education	1	229
	China	Huike	2010	Higher and vocational education	1	302

3. All-in-one type

Listed companies	China	TAL Education	2003	K-12	45.1	500
Start-ups (Unicorn companies)	India	BYJU'S	2011	K-12	10.8	1,576
	China	Yuanfudao	2012	K-12	7.8	1,544
	China	Zuoyebang	2014	K-12	7.3	1,335
	China	VIPKid	2013	Language education/K-12	4.5	975
	US	Duolingo	2011	Language education	1.7	148
	India	Unacademy	2010	K-12	1.5	328
	US	Course Hero	2006	Higher education	1.2	98
	China	Knowbox	2014	K-12	1	150
	China	Zhangmen	2010	K-12	1	350
	US	Quizlet	2005	K-12	1	62
	US	Age of Learning	2007	K-12	1	150
	China	17zuoye	2011	K-12	1	250
	China	Hujiang	2001	K-12	1	157

Note: Unicorn companies are unlisted companies with corporate value of USD 1 billion or more. Companies in emerging countries are highlighted. *1: The figures indicate listed companies' market capitalization (value around September 4, 2020) and start-ups' values at the time of final funding. *2: Delisted in 2011. *3: 13 years from the final year of preschool education until graduation from secondary education. *4: Founded as a textbook rental service for university students, but is strengthening learning services for students.

Source: Prepared by MGSSI based on Bloomberg, Pitchbook, HOLON IQ release information (September 3, 2020 release) and Crunchbase data.

Pearson, the world's largest education company in sales amount, is strengthening its EdTech segment through the digitization of textbooks and the acquisition of online learning businesses (Figure 3-1). Meanwhile, Benesse is also entering the field of EdTech through initiatives such as digitalizing distance learning courses and developing cloud-based LMS. Major IT companies are also beginning to provide services for learners on top of their existing offerings for educational institutions (Figure 3-2).

Figure 3. Examples of EdTech Initiatives by Major Education and IT Companies

1. Major Education Companies

Company name	Head office location	EdTech initiatives	Business model	Market capitalization ^{*1} (USD billion)	Sales (USD million)	Fiscal year
Pearson	UK	<ul style="list-style-type: none"> - Founded as a construction company in 1844, the company entered the field of education with the acquisition of major English teaching materials company Longman in 1968. - In 2000, the company entered the EdTech area by acquiring a company developing systems for conducting examinations on computer for qualifications in areas such as finance. In addition to promoting the digitalization of textbooks, it is strengthening the digital area through steps such as acquiring online learning service operators, and digital products and service accounted for 66% of the company's sales in 2019. 	<ul style="list-style-type: none"> 1. Support 3. Integrated 	5.3	4,939	19.1
New Oriental Education (New Oriental Education & Technology)	China	<ul style="list-style-type: none"> - A major supplementary learning company (examination preparation courses, private tutoring schools, language courses). - By the launch of the "Koolearn.com" online education service in 2000, the company's entered Edtech. The subsidiary Koolearn Technology, a company operating EdTech-related business, was listed on the Hong Kong market in 2019. 	3. Integrated	20.6	3,096	19.3
Benesse	Japan	<ul style="list-style-type: none"> - In services for educational institutions, Classi was established as a joint venture with Softbank in 2014 to provide the "Classi" cloud-based education support tool. As of May 2019, 1.16 million people in over 2,500 high schools nationwide used the service. In 2019, the company expanded its target audience to cover elementary and junior high schools by acquiring EDUCOM, which operates a teaching staff administration efficiency support system for primary and junior high schools nationwide. - It is promoting the digitalization of distance learning materials. Since 2015 the company has been in a business alliance with Udemy, a US platform service company providing a variety of adult education courses. It made an additional investment of USD 50 million in February 2020. 	<ul style="list-style-type: none"> 1. Support 2. Platform 3. Integrated 	2.6	2,997 ^{*2}	20.3
Cogna Educação	Brazil	<ul style="list-style-type: none"> - Higher education institutions such as Kroton, Platos, Sabre and VastaEducação are operated by the company. - It has been strengthening its EdTech segment by such as acquiring a learning service company with strengths in remote education in 2012. At present, it is developing adaptive learning software and school premise administration systems. 	<ul style="list-style-type: none"> 1. Support 3. All-in-one 	2.1	1,669	18.1

2. Major IT companies

Company name	Head office location	EdTech initiatives
Microsoft	United States	<ul style="list-style-type: none"> - The company offers Office 365 for Education, which includes Word, Excel, PowerPoint, OneNote, Teams, and more for teachers and students. The company also develops and sells affordable devices developed for teaching and learning. - In 2014, the company acquired Mojang, a game developer known for Minecraft, and entered into EdTech by providing educational content made of Minecraft. - LinkedIn, the business SNS it acquired in 2016, operates "LinkedIn Learning" offering free courses and paid certified courses for learning specialized knowledge in various industries in combination with the online learning services of Lynda.com, which was acquired for USD 1.5 billion in 2015.
Alibaba	China	<ul style="list-style-type: none"> - The company has previously operated e-commerce site "Taobao Education" for selling educational products and services. In March 2020, it advanced into the EdTech field by launching study Q&A platform "Bangbangda" for elementary and junior high school students. - The company provides the DingTalk videoconferencing and communication tool, which is an existing service, to educational institutions.
Tencent	China	<ul style="list-style-type: none"> - In 2014, the company established a joint venture with education giant New Oriental Education to enter the EdTech field. It also operates e-commerce site "Tencent Classroom" for selling educational services, and provides SNS and communication tools for educational institutions. - In May 2019, the company formed "Tencent Education" as a new division to integrate all of its education-related businesses. It has announced new services for learners such as homework support application "Tencent Homeworke" during the coronavirus pandemic.

Notes: *1: As of June 30, 2020. *2 Excluding sales from nursing business.

Source: Created by MGSSI based on Bloomberg data and materials published by the companies.

2. THE POSSIBILITIES OF EXPANSION IN PUBLIC EDUCATION

Policy trends in major countries toward introduction

As the efforts of existing educational companies such as private tutoring schools have progressed as the EdTech companies grow, services for learners leveraging EdTech have become widely used. Although the area of supplementary learning has been focused until now, it is possible that utilization by schools in public education will also become more widespread.

EdTech implemented in schools is mainly comprised of support products and services such as LMS and digital learning materials (previously mentioned Figure 1-1). LMS is a system for the centralized management of a variety of information related to learning. It is a tool that can not only reduce the teacher's school workload, but also allow students to self-manage the speed and the section of their learning, for example, by stopping the video in the middle of a lesson to watch it repeatedly according to their level of understanding. It has evolved to be unified with sharing tools for live streaming of lessons and communication, improving access to learning, and also individually optimizing learning content by analyzing the accumulated data. Among schools effectively leveraging such LMS and digital learning materials with an emphasis on personalized learning and instruction, there are some cases where classrooms are redesigned because the learning style is not constrained by fixed class units. For example, Summit Public Schools in the United States has removed classroom walls and set up an open learning facility with a total floor space of 650 square meters.² The four-story building of Denmark's Hellerup School has almost no walls other than for offices, and students in all grades learn in open spaces.

While we see such advanced examples, the educational policies of respective countries have begun incorporating perspectives aiming to realize effective learning leveraging technology (Figure 4). Policies are wide-ranging: the establishment of environments such as the Internet and devices; introduction of LMS, digital learning materials, digital whiteboard, STEM³ education materials for programming and others; and assignment of digital specialized personnel. Such comprehensive introduction of EdTech is seen to have progressed in small countries such as Denmark, Estonia, and Singapore, where consensus-building for reform is easier. The United States has the principle of competition between schools, such as enabling choice of schools including public schools. Regarding the use of EdTech, the country has many advanced initiatives, but there is significant variation. This is due to the economic divide between schools at the stage of preparing the environment, including the personal devices that are prerequisites for the implementation of EdTech.⁴ Furthermore, common issues faced in countries where the introduction of EdTech has not progressed are low digital literacy among teachers, no spare time to spend on new initiatives, and a lack of motivation for schools and teachers to introduce EdTech. The utilization of EdTech in Japan has fallen behind among developed countries. According to the OECD's 2018 PISA survey on schools with 15-year-old students, Japan ranked last among OECD countries in terms of both environment preparation and human resources.

² Michael B. Horn/Heather Staker. *Blended: Using Disruptive Innovation to Improve Schools*. Kyouikukaihatsu Kenkyusyo. p 207.

³ The acronym of Science, Technology, Engineering and Mathematics. Initiatives to strengthen education for integrated learning of the STEM area began in the United States in the 2000s. STEAM education adding the "A" of Art is also gaining attention.

⁴ See OECD Policy Responses to Coronavirus (COVID-19) "Learning remotely when schools close: How well are students and schools prepared? Insights from PISA" (Updated 3 April 2020)

Figure 4. EdTech-related Policies in Major Countries and Regions

Country/region	Overview	References
US	<ul style="list-style-type: none"> - The Office of Education Technology, a government institution founded in 1994, announces its basic policy called the National Education Technology Plan (NETP) every several years. Since 2010, it has shifted to the perspective of how to realize effective learning methods by utilizing technology and how to realize access to these learning methods. The education reform law of 2015 entitled the “Every Student Succeeds Act” is aimed at correcting disparity and strengthening STEM education, and specifies computer science as an important subject for the first time. - The 2020 NETP is planned to include a vision for continual use of EdTech by schools and school districts nationwide, and ensuring equal opportunities to learn using effective learning methods enabled by EdTech. 	1,2
Europe	<ul style="list-style-type: none"> - Prior to 2002, focus was on establishing computer and Internet environments in schools, but since 2002, it was gradually shifted from “e-learning” using computers to “Educational Innovation” integrating e-learning and ICT. European countries introduced policies on education incorporating ICT by 2011. 	3
Denmark	<ul style="list-style-type: none"> - Since 2007, assignments requiring students to respond using the Internet have been introduced in examinations to evaluate their digital skills. - Since 2015, comprehensive school support tools have been introduced to support students, teachers, and schools in learning and collaboration. 	3,4
Estonia	<ul style="list-style-type: none"> - The “Tiger Leap” Project was implemented from 1996 to 2000, establishing Internet environments and conducting ICT education for teaching staff in all schools. - Since 2002, “e-school” for performing learning management and online education has been established. Since 2012, the “ProgeTiger” initiative for conducting programming education has been issued to promote initiatives for both the utilization of digital technology and the development of digitally literate human resources. 	3
UK	<ul style="list-style-type: none"> - Since around 2003, the United Kingdom has introduced electronic blackboards in all classrooms to develop an ICT environment ready for teachers' use, and prepared various conditions for the proliferation of ICT. - Since 2014, in England, “Computing,” mainly made up of computer science, IT, and digital literacy, has been positioned as a systematic subject in primary and secondary education. - Audits of schools have been conducted by Ofsted (Office for Standards in Education, Children’s Services and Skills) in England since 1992, and the results are made public. In 2019, with more focus on the curriculum, Ofsted established a framework for assessing the quality of education comprehensively, from the perspectives of guidance, learning, evaluation, and outcomes. The presence of such evaluation has also provided motivation for schools to incorporate EdTech. 	5
Singapore	<ul style="list-style-type: none"> - The “ICT Master Plan for Education” was issued in 1997, and is revised every five years. The establishment of Internet environments, training of teaching staff, and development of digital skills are main pillars. 	4
South Korea	<ul style="list-style-type: none"> - The “SMART Education initiative” was issued in 2009 to indicate the direction of incorporating technology into the education system. “Smart” is an acronym for the five keywords representing the goals of the education system: Self-direct, Motivated, Adaptive, Resources, and Technology Embedded. - The infrastructure development period (phase 1) occurred from 1999 through 2001, followed by the period from 2002 to 2006 when ICT utilization was becoming widespread. Phase 3 came around 2010 with individualized learning and enhanced services. Progress is being made in the use of online lectures, digital textbooks, and cloud-based sharing of teaching materials. 	4
Japan	<ul style="list-style-type: none"> - In 2011, the Ministry of Education, Culture, Sports, Science and Technology indicated the policy of creating learning and schools befitting for the 21st century in the “Vision for ICT in Education.” - The Ministry of Economy, Trade and Industry established the Educational Industry Office in the Service Affairs Policy Division in 2017. - The “Future Classrooms and EdTech Study Group” was established in January 2018, and a website communicating relevant information was established along with the commencement of a verification project. - The “Five-year Plan for Establishing and Environment for ICT in Education” was established in 2018. It incorporated establishing wireless WAN, providing enough learning PCs for one in three classes, and supplying one teaching PC each teacher in charge of a class. - The “Headquarters for Promoting the Realization of GIGA (Global and Innovation Gateway for All) Schools” was established in December 2019 (FY2019 supplementary budget of JPY 231.8 billion). It set the goals of providing one device to each student, preparing a high-speed communication network environment, and introducing systems for supporting the reduction of school administration workload. 	6
China	<ul style="list-style-type: none"> - In 2011, a 10-year plan aimed at ICT in education was announced, stating that 8% of the annual education budget would be spent on ICT in education. The five-year plan updated in 2016 discusses new business models: considerations include strengthening data integration, revising the existing model for providing content, and introducing STEAM education, which adds Art (creativity) to STEM education. 	2

Source: Prepared by MGSSI based on the following reference materials

1. Materials published by the U.S. Department of Education, Office of Educational Technology
2. Materials from 1st BCG presentation in the Ministry of Economy, Trade and Industry’s “Future Classroom” and EdTech Study Group
3. European Commission “Digital Education Policies in Europe and Beyond” (2017)
4. UNESCO “Building tomorrow’s digital skills: what conclusions can we draw from international comparative indicators?”
5. OECD
6. Materials published by the Ministry of Education, Culture, Sports, Science and Technology and the Ministry of Economy, Trade and Industry

Acceleration aimed at the continuation of learning during the coronavirus pandemic

Under these conditions, the coronavirus pandemic led many developed countries, including Japan, to introduce or consider online education; consequently, they are accelerating their moves toward the utilization of EdTech in public education.

Firstly, measures for education to continue during school closures have been taken in many countries. At the end of March 2020, South Korea announced that it would begin online classes during the new semester, along with the policy of schools and the government lending PCs or tablets to low-income households that do not own them. In Europe, Estonia introduced tools made by Estonian EdTech companies within the country and also abroad, providing many of those for free. As such, the country strengthened initiatives while developing its domestic industry at the same time. Countries such as the UK and Germany are contributing funds to support the development of devices and communication environments and the introduction of EdTech services. In Japan, the Ministry of Education, Culture, Sports, Science and Technology decided to move up the schedule for the “GIGA (Global and Innovation Gateway for All) Schools” project, which aims to provide one device per student and realize a high-speed communication network by fiscal 2023, to be completed by the end of fiscal 2020. It appears that the development of an environment for the utilization of EdTech has begun full-fledged.

Initiatives in emerging countries will lead going forward

Such movements are accelerating further in emerging countries. In particular, the progress in China’s initiatives is notable. The Chinese Ministry of Education opened the National Online Cloud Class Room, and formed the National Tech Alliance including private sector companies such as Alibaba, Huawei, and Baidu. It immediately developed an environment enabling up to 50 million students to learn simultaneously. This led to the start of online education by many schools during the coronavirus pandemic. In addition to the industry aspect where companies are growing, the country is also leading the world in the policy-enforcement aspect.

Apart from China, emerging countries and developing countries (see the column on page 11) with inadequate school infrastructure and human resources are shifting to the direction of utilization of EdTech, and it is possible that they will drastically improve access to learning in public education and realize the provision of individually optimized learning programs.

India incorporated the utilization of EdTech in the National Education Policy 2020, the first new education policy in 34 years announced at the end of July 2020. In addition to digital textbooks, it also covers the development of smartphone and tablet apps for use at home and school, appropriate allocation of teachers based on data analysis, and development of evaluation systems. Furthermore, the policy includes a plan to establish an “Academic Bank of Credit (ABC)” for digitally storing academic credits earned from recognised higher education institutions. With the target of raising the enrollment rate in higher education including vocational education to 50% by 2035, multiple exit options will be provided for students to flexibly choose one year or two years to complete their courses, to facilitate learners’ enrollment. The content learned in different educational institutions and courses will be centrally managed by the ABC.

These are policy movements that aimed at improved access to learning and individually optimized learning. In India, EdTech companies providing services for learners are growing before the rise of major private tutoring schools, and such EdTech companies driving the education industry will also likely partner with the government .

3. POSSIBILITY OF PENETRATING VOCATIONAL EDUCATION

EdTech companies meeting globally heightened upskilling needs

In recent years, the fragmentation of professions and the changing industrial structure due to society’s digitalization have heightened the need for working adults to continue learning for upskilling and reskilling. Since it is difficult for working adults to spend substantial time learning systematically or studying abroad, the use of

EdTech has been promoted to satisfy their learning needs.

In the area of vocational education, integrated learning services leveraging EdTech have been provided as an extension of distance learning courses, but platform-type services for learners have improved access drastically in recent years. In particular, as represented by Coursera, EdTech companies offering services called massive open online courses (MOOCs) (previously mentioned Figure 2-2) provide courses from diverse universities and teachers to an unspecified number of people to meet globally heightened upskilling needs. In addition to free courses, some official university degree programs are offered in the form of shorter courses at a lower cost than normal, and an increasing number of programs are issuing digital diplomas such as certificates or micro-credentials.

Coordination with companies is also progressing, and Coursera's AI-powered "Skills Benchmarking Tool" for businesses analyzes and suggests which courses employees should take by comparing with industry-standard skills. US-based Guild Education provides learning services for employees of major companies such as Wal-Mart and LOWE to learn from programs of several nonprofit universities. The company's client companies have, many employees who do not have specialized skills and are working in jobs that are likely to become unneeded in the future. For example, cashiers are learning with the aim of working on the sales floor, where more value-added customer service is required.

Dramatically improved access brings together an enormous amount of learning content and learning history on the platform, which expectedly enable to offer even more individually optimized programs in the future. For this reason, the potential of platform companies is increasing in the field of vocational education.

Continuous skill acquisition becoming mainstream

Those services of EdTech companies contribute to vocational education by utilizing programs provided by universities and other higher education institutions, making them accessible to more working adults. In this context, attention is now being drawn to a new learning style in which one acquires skills and built them up over their lifetime through "modular" programs. These programs are provided over a short period, unlike the conventional style of learning that ties students to a particular course in a single university for several years. In such cases, it is essential to issue certificates called "alternative credentials," instead of formal degrees, such as the micro-credentials mentioned above. For this reason, in 2019, the European MOOC Consortium moved to create a framework presenting an industry standard for micro-credentials, which differ depending on the country or educational institution.⁵

Concerning business-related skills, many of them are universal. As modular programs become available worldwide, the style of learning by building up skills over one's lifetime will be seen to spread globally.

Coronavirus pandemic leading to deeper collaboration with companies

The leverage of EdTech in the field of vocational education is accelerating during the coronavirus pandemic. According to the ILO, 94% of the world's workers were affected by workplace closures or refraining from commuting as of May 2020, and an estimated 300 million full-time workers, or 1.6 billion people including irregular employment might lose their jobs. In addition to more people having time to learn due to unemployment or suspension of business, the clear acceleration of digitalization in a variety of fields has led to an increase in situations where workers face a skill gap and the need for upskilling has become apparent.

Users of the Coursera service mentioned above have surged during the coronavirus pandemic, and the number of new registrations with the company over the 30 days from mid-March to mid-April 2020 exceeded 10 million, with the total number of learners reaching 68 million in August. Of the students, 50% are residents of Europe or the United States, but when viewed by country, the most popular countries following the United States are emerging countries such as India, China, Mexico, and Brazil. The number of learners using Udemy's platform-

⁵ See OECD Education Working Papers No. 216. "The emergence of alternative credentials."

type service connecting people who want to be instructors with learners increased by 425% month-on-month in late March, and had reached 400 million registered users as of September. On top of Europe and the United States, students increased significantly in India.

Furthermore, EdTech companies are also making moves to deepen ties with companies that can provide employment for learners. Guild Education mentioned above started a new business that could be described as an HR service connecting the unemployed with companies by introducing job vacancies after providing learning opportunities to the unemployed. Learn In, a start-up company founded in the United States in March 2020 to provide learning services to corporate employees, revealed the concept of “learning leave” where employees are put on administrative leave or standby at home instead of being dismissed, and provided with upskilling opportunities during that time.

4. THE EXPECTED PARADIGM SHIFT IN LEARNING

This article has summarized the current state of the EdTech industry, and provided observations on the future in the fields of public education and vocational education. In the field of public education, as the introduction of EdTech progresses, learning will likely be transformed significantly from being centered on group education in one-way lecture format to personalized learning. It is believed that emerging countries and developing countries will lead such changes because countries where the enrollment rate is expected to rise in the future can implement EdTech at a time when they improve their education systems on a full scale. For many developed countries, there are issues such as motivation for schools and teachers to introduce EdTech and a shortage of specialized human resources, and it is not easy to drastically change teaching methods that have been used for many years. Nonetheless, the coronavirus pandemic has been providing a tailwind for such change. In the field of vocational education, as the services provided by EdTech companies are further utilized for flexibly responding to heightened upskilling needs, modular learning will likely become more widespread, with greater emphasis placed on the accumulation of such learning over one’s lifetime. Providing universal skill sets worldwide will lead to spread such a learning style globally.

This could be described as a “paradigm shift in learning”: the mainstream of learning is moving from group education to personalized learning optimized to each individual, and a modular, lifelong form of learning is emerging in vocational education. As a result, it is believed that the approaches and roles of educational institutions and teachers will also change. Higher education institutions will expand their role in vocational education to more flexibly respond to changes in companies and industry. Furthermore, sustaining learners’ motivation to learn is an issue when part or all of a course is conducted online. Due to the need for better support functions, teachers will not only serve the role of specialists in their subject, but also have additional roles such as facilitator and mentor. It will also be necessary to develop specialized personnel for performing each of these roles. Amid such changes, it is important to review group-based or face-to-face learning, such as through group work and creative activities. Reviewing how learning can be made more in-depth by the gathering of people and what value can be obtained from there is expected to bring about an evolution in new ways of learning combined with EdTech.

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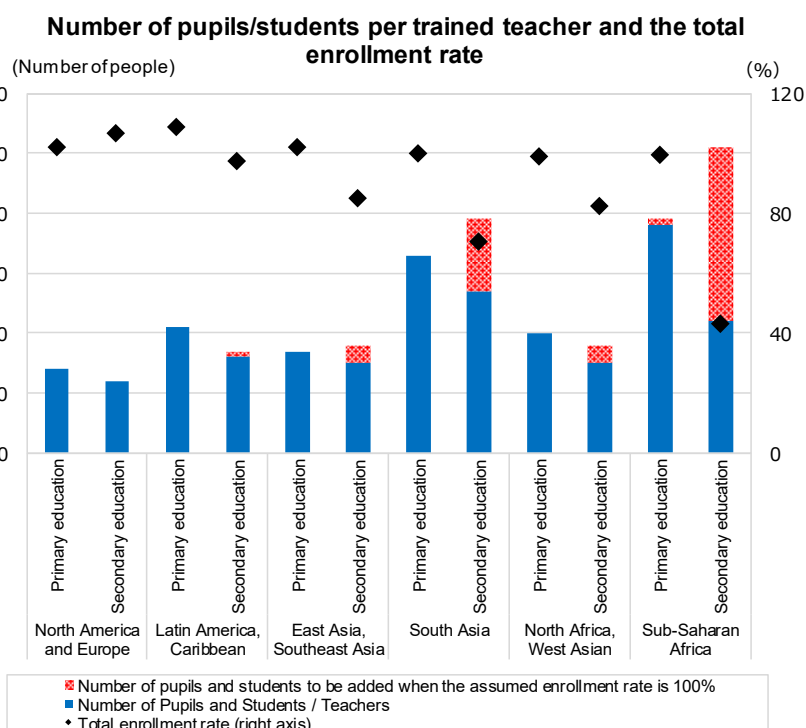
Column: Shortage of Educational Resources in Emerging Countries and Developing Countries

International organizations adopt human resource indicators when showing a surplus or shortage of educational resources. In particular, UNESCO emphasizes the number of pupils and students per trained teacher, who became qualified over time. In this indicator, UNESCO uses 25 students as a target for the maximum number of students when secondary education produces effective learning outcomes, and suggests that instruction may be inadequate if this number of students is exceeded. The figure below shows this indicator by region.

According to this, developed countries have 14 students per teacher in primary education and 12 in secondary education, fully satisfying the UNESCO target. In contrast, in emerging countries and developing countries, the number of students greatly exceeds the UNESCO target, particularly in primary education in South Asia and Sub-Saharan Africa, illustrating the shortage of human resources. It appears that the number of students per teacher is low in secondary education compared to primary education in many emerging countries and developing countries, but this reflects the low enrollment rate in secondary education. Assuming that the enrollment rate is 100%, the number of students would be 39 in South Asia and 51 in Sub-Saharan Africa (red part of the bar graph).

The United Nations has stated in target 4.1 of the SDGs that it will, "by 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes." As many countries aim to improve primary and secondary education by 2030 and the enrollment rate is expected to rise in the regions above, the shortage of personnel who are not immediately replaceable seems to be a greater challenge than the shortage of facilities in education resources.

Note: See UIS Fact Sheet October 2016, No.39.



Note: Both the total enrollment rate and the number of pupils and students / teachers are estimates for 2018 or the most recently available year. The total enrollment rate is the ratio of the number of people enrolled in school regardless of age in relation to the official school-aged population. It may exceed 100% because it includes students outside the applicable age.

Source: Prepared by MGSSI on UNESCO World Teacher's Day 2019 Fact Sheet and UIS database

[Reference] Global Education Market and Enrollment Rate (2018)

	Total (USD billion)			Enrollment rate (%)		
	Education market (A)	GDP (B)	A/B (%)	Primary education	Secondary education	Higher education
World	4,946	82,683	6.0	101.2	76.0	38.4
Developed countries						
United States	1,407	20,580	6.8	101.3	99.3	88.3
Japan	229	4,958	4.6	n/a	n/a	n/a
Germany	212	3,953	5.4	103.9	97.6	70.3
UK	204	2,861	7.1	101.0	120.8	61.4
France	169	2,779	6.1	102.9	104.1	67.6
Canada	120	1,716	7.0	101.5	114.1	70.1
South Korea	109	1,720	6.3	99.6	98.5	95.9
Australia	101	1,419	7.1	100.2	132.8	107.8
Italy	94	2,084	4.5	101.2	101.4	64.3
Spain	87	1,419	6.2	102.0	126.2	91.1
Netherlands	52	914	5.7	105.2	134.3	87.1
Sweden	42	556	7.5	128.6	151.7	72.5
Belgium	40	543	7.3	103.4	156.0	78.9
Emerging economies						
China	806	13,876	5.8	100.2	n/a	50.6
Brazil	165	1,885	8.8	115.4	100.8	51.3
India	143	2,783	5.1	96.8	74.4	28.1
Indonesia	133	1,042	12.7	106.4	88.9	36.3
Russia	75	1,652	4.5	104.7	103.8	84.6
Mexico	56	1,221	4.6	105.0	105.1	41.5
Argentina	41	520	7.9	109.7	108.7	90.0
Turkey	40	769	5.3	94.9	104.5	113.2
Poland	32	585	5.5	96.9	112.0	68.6
Thailand	28	506	5.6	99.8	117.7	n/a
Egypt	17	250	6.8	106.3	87.9	35.2
Nigeria	16	421	3.7	n/a	n/a	n/a
Philippines	16	330	4.7	101.9	84.0	35.5
Vietnam	15	245	6.0	110.6	n/a	28.6
South Africa	15	368	4.0	98.5	100.5	23.8
Bangladesh	9	270	3.3	116.5	72.7	20.6
Iran	9	306	2.8	110.7	86.3	62.8
Saudi Arabia	8	787	1.0	99.8	110.1	68.0
Pakistan	7	284	2.5	94.3	42.7	9.0
Kenya	7	88	7.8	n/a	n/a	11.5

Note: Countries with GDP of USD 500 billion or a population of 50 million or more in 2018 are shown (with the exception of Switzerland). *1: Government estimate, *2: 2019 figure, *3: 2017 figure

Source: Prepared by MGSSI using data collected by IHS Markit from international organizations such as OECD and statistics from each country for the education market (total of public and private spending), and UNESCO Institute for Statistics data for the total enrollment rate.