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THE BOSTON CONSULTING GROUP

Creating the Best Opportunities for Everyone

Empowering the Individual through Digital Education

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AT A GLANCE

The United Nations Global Sustainability Index Initiative (UNGSII) Youth Survey shows clear differences in access to education and digital media that exist among the world's children and adolescents. For decades, there has been no real progress towards genuinely equal opportunities on a global scale. In order to truly unlock the future for each and every person in the next generation, the education sector needs a new vision and new digital learning methods. The dream could come true where all children and adolescents receive a qualified education that gives them ample opportunities and enables them to capture their potential. Equal opportunities in education, regardless of parental income, are feasible – and the digital possibilities are the way to achieve this dream: Especially by improving access to education for everybody, including the less privileged children, and through personalization supporting each child's individual strengths, needs and interests. But a lot has to change to get there. The concrete implementation of new structures and technologies requires a much bigger willingness to change, higher investments and systemic changes – and all stakeholders to take an active role in the renewal of our education system.

Global digitalization is advancing at a rapid pace, a well-known fact gladly pointed out in many publications. The shift becomes more tangible when one notes that there are now more mobile phone connections than people worldwide and that more people now have access to a mobile phone or smartphone than to a toilet. Increased computing power, big data, and innovative applications have led to tremendous changes in many aspects of our lives and work.

Yet the education sector has been very slow to react to the digital transformation. There remains a distinct unavailability of qualified instruction in many parts of the world. Digitalization in particular can help provide all students with professionally sound, qualified instruction. It can ensure that genuinely equal opportunities are created for all children and adolescents by delivering education tailored to the talents of each child in almost any place and at any time, regardless of their parents' income.

At the same time, the content of education has to change significantly, so that students not only acquire the foundational literacies, but also the necessary competencies, i.e., the analytical, creative, and methodological skills that play an increasingly important role as well as character qualities like curiosity, initiative, and perseverance. In addition, content must be better communicated and become more flexible. Curricula must adapt to increasingly volatile conditions faster than ever before and be better personalized to the needs and learning progress of each individual.

The aim of all these endeavors must be to open up the greatest possible opportunities for each individual to live up to their potential. For this reason, governments around the world need to begin to systematically transform their education systems now. Providing children with the best start to life and giving those already working the opportunity to adapt to change through continuing education will create a common basis for the well-being of all income classes across society.

Education 2017: Why We Cannot Be Satisfied with the Status Quo

Lack of universal access

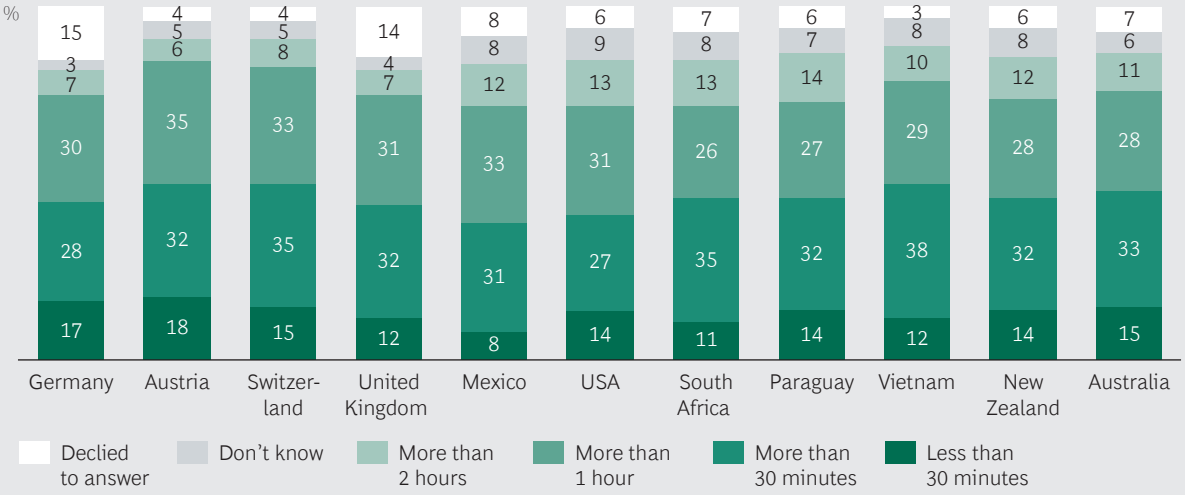
The world is becoming increasingly digital, with some 3.2 billion people going online in 2015, a figure that is only increasing. However, the availability and quality of education are not growing at the same pace. The UN's International Commission on Financing Global Education Opportunity painted a bleak picture in its final report for 2016: There are currently 263 million children in the world who receive absolutely no education. If the conditions for access to education do not change, this number could rise significantly. By the year 2030, 436 million of a total of 1.4 billion school-aged children could have no access to educational institutions, and another 446 million would receive only a rudimentary primary education. The hardest hit will be poor countries with minimal educational and transport infrastructures. There are many problems here, including the simple lack of available educational institutions, long or dangerous journeys to and from school, and not enough or poorly qualified teachers.

The UNGSII Youth Survey polled children, adolescents, and young adults between 10 and 29 years of age from 26 countries around the globe on a vast number of issues. These range from their family situation to, for instance, the respondents' personal views on gender equality and their access to clean water. One part concerned topics around education. While the survey is still ongoing in 15 countries data sets for the first 11 countries already offer significant trends and insights.

Among other things, the respondents were asked to estimate the time it takes them to get to school every day: Travel times up to and exceeding one hour are common in all countries. This applies both to more affluent countries like Germany or New Zealand and to less affluent ones like Paraguay and Mexico. The data collected to date show only a slight tendency towards longer travel times in less affluent countries. The basic issue of long travel times exists in all surveyed countries. These figures call for change, because long travel times are a hindrance for good education. A suitable relief lies in the implementation of modern, digital learning methods – both in poorer and in more affluent countries.

A long road to education

Figure 1 | How long does it take you to get to school?

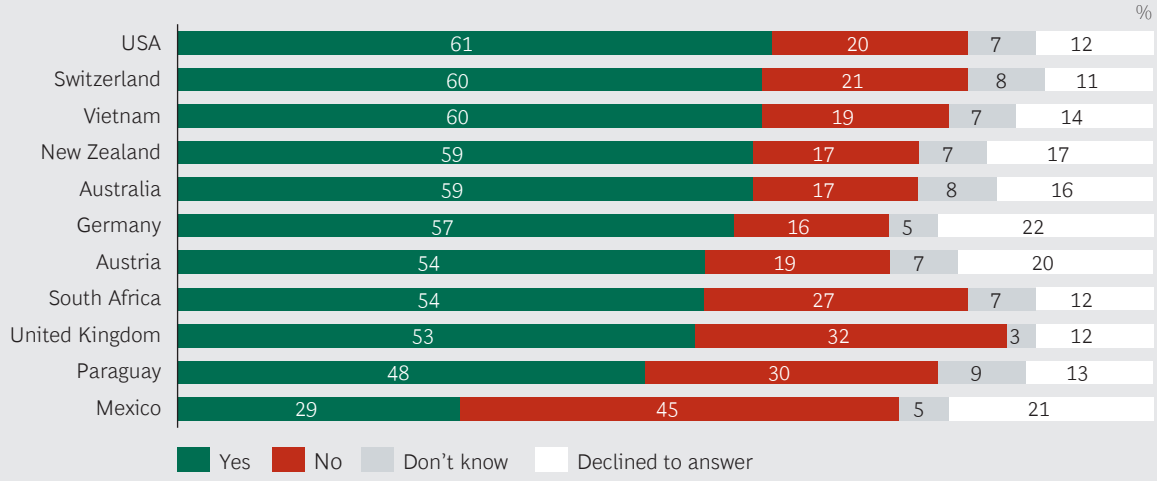


Source: UNGSII Youth Survey

Most young people today have access to the internet: More than half of them have internet access at home, effectively placing a plethora of knowledge at their fingertips. The only exceptions to this are Paraguay (48 percent) and Mexico (29 percent). Even those without internet connections in their homes have a decent chance to go online: between 68 and 83 percent are able to access the internet in schools, libraries, and the like – again with the exception of Mexico, where only 45 percent can make use of this option.

Almost a given: Internet at home – only Mexico trailing behind

Figure 2 | Do you have internet access at home?

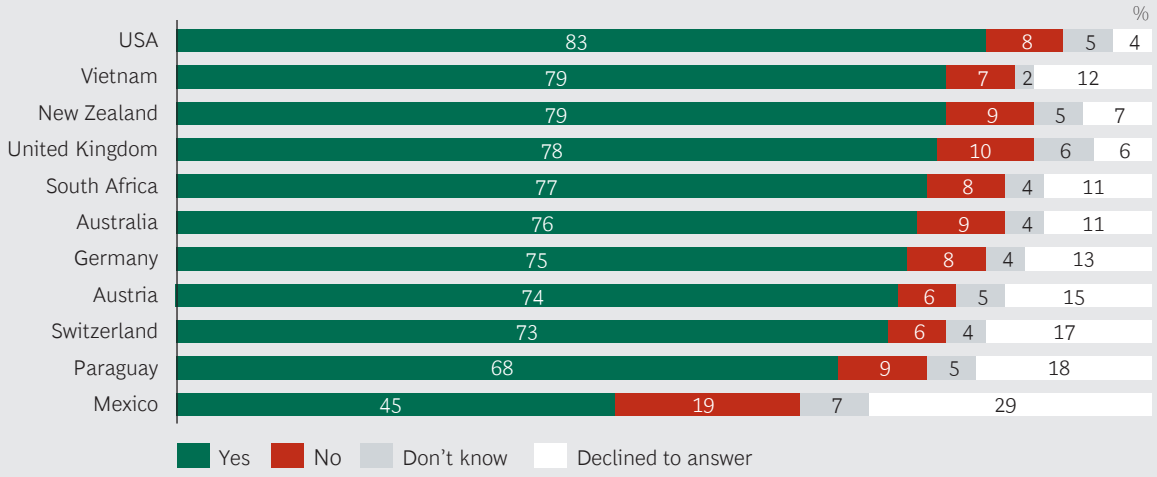


Source: UNGSII Youth Survey

The world is connected – even if not at home

To the many young people who do have internet access, the internet is second nature: three quarters (73 percent) of them use it daily. This behavior is universal across all polled countries, peaking at 81 percent in Vietnam and bottoming out at 64 percent in Mexico. Yet, even the numbers for Mexico increase by 18 percentage points when one includes the data for online activity "several times per week".

FIGURE 3 | IF YOU DO NOT HAVE INTERNET ACCESS AT HOME: DO YOU HAVE ACCESS TO THE INTERNET AT SOMEWHERE OTHER THAN HOME, LIKE SCHOOL, OR A LIBRARY?



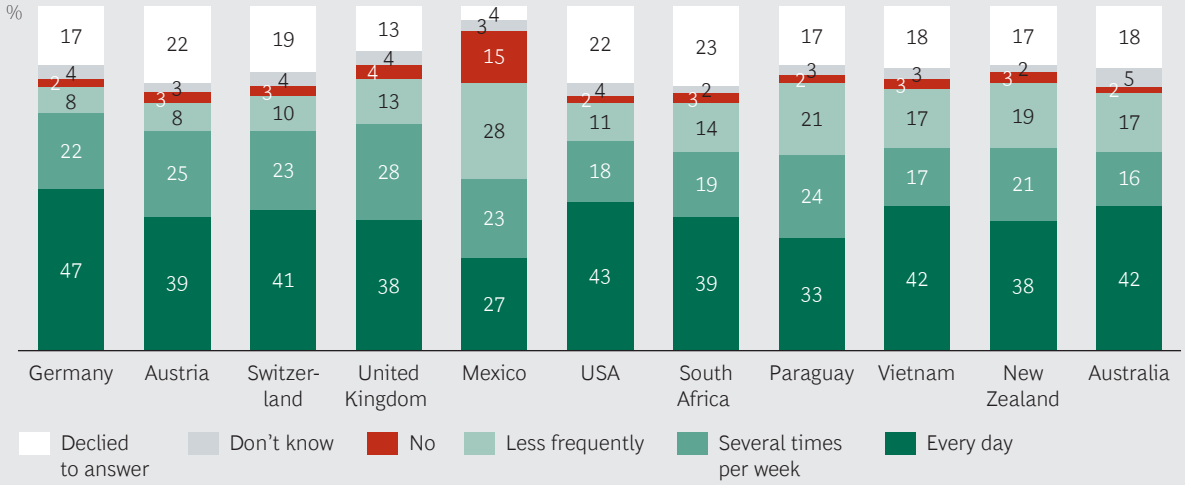
Source: UNGSII Youth Survey

However, students across all eleven countries do not use their online access primarily for education: Other activities take precedence. Asked about the main reason for using the internet, the overwhelming majority in all countries put entertainment first (between 54 and 74 percent). As the second most important reason most participants indicated "interacting with friends" across all 11 countries. Schoolwork as a reason to go online, in contrast, took an unequivocal last place in all countries surveyed except Vietnam.

The internet is still not ingrained as a tool in day to day life at school – be it private or to support the education. In none of the 11 countries polled did the majority of students use the internet every single day at school or university. This low utilization applies even to high-income countries and is all the more prominent in less affluent countries like Mexico and Paraguay. Indeed, between 31 percent (United States) and 66 percent (Mexico) indicate that they make use of the internet at school or university less than every day – and much of this use will certainly be social or for entertainment, rather than to support learning. So, there can be no question of a meaningful integration of the internet into the normal course of lessons.

The neglected resource – internet use in schools & universities

FIGURE 4 | IN SCHOOL, OR AT UNIVERSITY: ARE YOU ABLE TO USE THE INTERNET AND IF YES, HOW OFTEN?



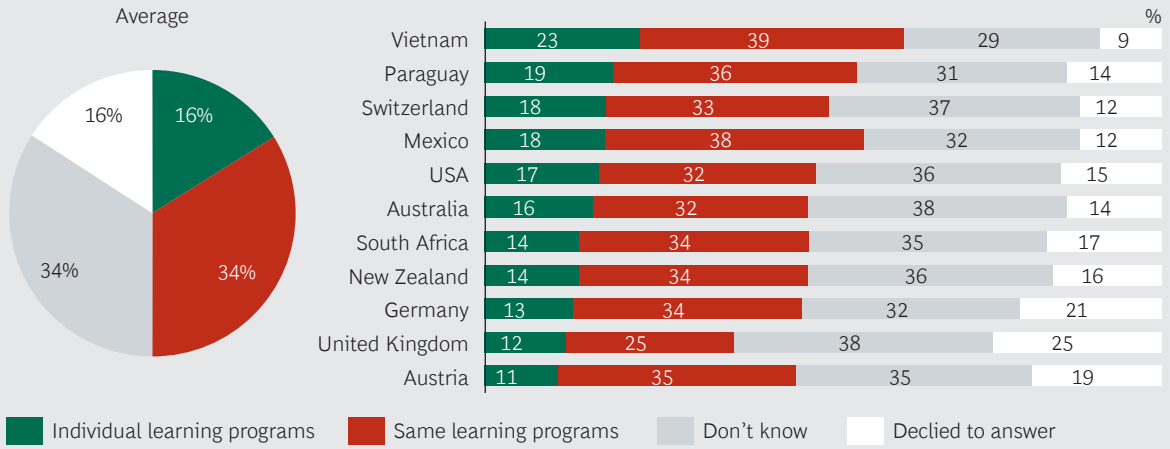
Source: UNGSII Youth Survey

No individual promotion

Digitalization has led to tremendous changes in many aspects of our lives and work. It has enabled significant increases in productivity, consumers can receive tailored offers to an unprecedented degree, patients can receive highly personalized therapies, and digital technology has allowed the creation of efficient, individualized transport-sharing models. It is only in the field of education that we expect everyone to learn the same material in the same way. Despite being technically feasible, learning materials are rarely adapted to the strengths, weaknesses, inclinations, and abilities of the individual student. For the most part, the dynamics of the lessons are still based on the learning level of the majority in class or on rigid systemic specifications rather than on the individual progress of each student. The use of digital applications to deliver individualized instruction remains scarce. Only in Vietnam do more than a fifth (23 percent) of all polled students indicate that they receive their own personalized learning program. In all other countries, the fielding of corresponding applications struggles within a range between 11 and 19 percent. Roughly a third of all students indicate that they get the same learning application regardless of their individual skills and needs. Additionally, an average of around 34 percent of students indicate that they do not even know whether their programs are individual or not.

Individual learning – not today!

FIGURE 5 | DO ALL KIDS RECEIVE THE SAME LEARNING PROGRAMS TO LEARN ONLINE OR ARE THE TEACHERS PROVIDING YOU WITH INDIVIDUAL LEARNING PROGRAMS?



Source: UNGSII Youth Survey

Unequal starting points

The dependence of educational quality on external factors like income and social class remains one of the major challenges in the fight for equal opportunities. This is not merely a difference between high- and low-income countries. In many affluent countries, too, there are clear correlations between the social status of parents and the educational level of their children, as seen recently in the indicators included in the "Education at a Glance" report released by the OECD. In the existing education system, many children's opportunities are already determined by their background.

Lack of future-oriented content

But what do children and adolescents have to learn to be fit for the challenges of the 21st century? Foundational literacies such as reading, writing, and arithmetic will still remain essential in the future. But students will also need a deep foundation in digital skills. This includes not only the use of digital media, applications, and content, but also a fundamental understanding of programming and IT architecture and solutions. Clear educational deficits with regard to these fundamental requirements can already be observed – not just in low-income countries, but also in middle- and high-income economies, as shown in the results of the 2015

joint study by The Boston Consulting Group (BCG) and the World Economic Forum (WEF) "New Vision for Education: Unlocking the Potential of Technology."

Competencies such as creativity, teamwork, and problem-solving skills as well as character qualities such as curiosity, initiative, and leadership skills are playing an increasingly important role. These are not innate per se, but can be trained. Too often – and this applies to many countries – they are not being taught at all or only insufficiently. In an international report by UNICEF, 40 percent of companies identified deficits in communication, teamwork, and critical thinking among job applicants. Data from the World Bank shows considerable variation in these skills even in highly developed nations: While young people in Finland, South Korea, and Japan achieve record levels in nearly every aspect considered, Americans do well in terms of problem-solving and curiosity, but less so when it comes to being creative. Germans score average to good scores on the basic skills of arithmetic and scientific understanding, as well as in terms of creativity. But in terms of critical thinking and problem solving, German students as a whole are mediocre at best, and they are really weak in the important area of information and communication technology (ICT).

Why are competencies and character qualities more important today than ever? They are necessary if the next generation is to be able to survive the rapid process of change currently underway that continues to gain momentum. For workers, this means having to adapt to the changing demands of the labor market, retraining, and gaining further qualifications. And this pressure to change will only increase. This is also seen in the results of the 2017 BCG study "Schöne neue Arbeitswelt 4.0?" which suggests that the jobs of 7.7 million people in Germany will have radically changed by 2025 through the use of robotics and automation. This upheaval will affect not just workers with minimal qualifications – 60 percent of the concerned workforce are skilled specialists.

Systems unable to adapt

It is not just the content of education that needs to adapt to the requirements of the digital future. The way education is provided remains largely anachronistic, too. While digitalization makes it possible to communicate and choose how to be informed wherever one is located, educational systems continue to use rigid structures with methods and content that are decades behind current requirements. Learning is institutionalized, tied to fixed places and times, educational paths are firmly defined, and what is taught only evolves slowly, over decades even. Meanwhile, almost half of the world's population can be reached online. Education systems are letting great potential for contemporary, flexible, and individual learning lie fallow. In addition, such a sluggish dynamic in our schools does not exactly make the idea of entering teaching as a profession very attractive – not a good starting point in the increasingly tough competition for the best talent.

Digital technologies need to be a crucial component in the qualification and further education of teachers in the educational landscape of the future. Because even the teachers themselves are learning in a system that is too rigid. In Germany, for example, new online tools could mean the end of rather static continuing education formats, such as time-consuming seminars organized by the school district at a fixed location.

The content of teacher education also needs to adapt. In addition to the digital skills teachers of the future will require, the long-term positive effects of targeted training in communication and team skills, cooperation and conflict resolution, curiosity, perseverance, creativity, and leadership are underestimated. The so-called social and emotional learning (SEL) continues to receive short shrift in the training of teachers and educators. And yet it is tremendously important to provide teachers with the tools they need to use SEL to promote the competencies and character qualities of their students.

Future challenges in the teaching profession include being able to not only use digital learning tools, but also to implement the new opportunities for truly modern instruction. Ideally, personalized learning content will be flexibly adapted to changing external needs of society and the individual abilities and talents of each student. In the future, teachers will need to recognize new trends and content and integrate them flexibly into curricula. In other words, they need to understand their duty not so much as just implementing rigid curricula that barely change from one year to the next, but instead to see themselves as active designers of what they teach.

How Good Education Can Become Possible for Everyone

… with a new vision

The dream could come true where all children and adolescents receive a qualified education that gives them ample opportunities and enables them to capture their potential – the education being personalized to their individual inclinations and abilities. Equal opportunities in education, regardless of parental income, are feasible – and the digital possibilities are the way to achieve this dream. But a lot has to change to get there.

The concrete implementation of new structures and technologies requires all stakeholders, politicians, administrators, educators, parents, researchers, and industry to take an active role in the renewal process. Unfortunately, many stakeholders are still more worried about the potential risks of profound change – rather than being open to new ways and look at the expected benefit, especially for the weaker and less privileged members of our society. The will to preserve the status quo in the education sector is widespread. In order to provide each individual with more opportunities through education a significantly higher will to innovate is needed. It is instrumental to orient the educational landscape primarily on the needs of the students. Teachers who are already taking innovative approaches should be encouraged.

For political decision-makers in the vast majority of the world's countries, this change in mentality will also mean making education a budget priority. There are considerable differences among the OECD countries: New Zealand, Colombia, and the United States invest more than 6 percent of their gross domestic product in the education sector. Russia, Italy, and Luxembourg, meanwhile, invest less than 4 percent. Germany, at 4.3 percent, is also below the OECD average.

When providing support to lower-income countries, education must be given a much higher priority than it currently receives. From 2002 to 2014, the OECD's annual development aid for education grew from $5 to $12 billion, while infrastructure support increased from $10 to $37 billion over the same period.

… with digital learning methods

The growing spread of the internet and new technologies is opening up new opportunities for creative solutions to solve the lack of educational availability. Even in remote areas without dense school infrastructure, children and adolescents can now gain access not only to general education, but even to higher professional qualifications.

In the Brazilian state of Amazonas, for example, the Centro de Mídias de Educação do Amazonas (Cemeam) provides remote village schools with the necessary equipment for efficient network access, generally via satellite. Specialist teachers provide instruction centrally from a studio in Manaus, while on-site teachers clarify possible ambiguities and ensure order during online lessons. In an area more than four and a half times the size of Germany, 60 specialist teachers and 2,200 on-site teachers are teaching more than 30,000 students.

The Khan Academy is also making use of digitalization: The California-based institute offers free educational videos in the fields of mathematics, science, history, and economics to students around the world, coupled with a system to check student learning. Currently, more than six million students use about 4,000 videos each month. As a result, they perform better on standardized tests than their peers.

The digital technology of the 21st century also offers a great opportunity to provide individual support to each student by delivering educational content tailored to their needs. Personalized curricula and materials designed to evaluate individual learning success give students exactly the content they need to maximize their learning progress, whatever their situation.

For example, Arizona State University (ASU) has partnered with adaptive learning provider Knewton and textbook publisher Pearson Education. Knewton uses algorithms to individualize teaching and learning plans for ASU students, while Pearson delivers the content. The result: ASU's dropout rate has fallen from 13 percent to 6 percent, while its graduation rate has risen from 66 percent to 75 percent. This approach could easily be adapted to the school sector as well.

Traditional forms of teaching and computer-based learning do not have to be mutually exclusive; indeed, they can complement each other quite well. In Peru's Innova Schools, students work on their own on computers for about 30 percent of their school day. In the remaining 70 percent, they discuss questions that come up with their teachers and discuss the insights gained in the classroom.

In order to realize the vision of education as a true creator of opportunities, curricula and teacher education must also become more adaptable. To this end, teachers also need the opportunity to gain further qualifications individually online. There are already tools for this: The Teachscape platform offers more than 160 different digital courses with more than 2,000 instructional videos for teachers. Edthena allows instructors to upload videos of their courses in order to get feedback from colleagues and mentors on the quality of their teaching. Edconnective, another online platform, allows for live critiques, where experienced educators give their colleagues one-on-one tips on teaching.

… with new and adaptable content

Digitalization is changing our lives, but it is also helping us make positive use of these changes. The key to this is the ability to use digital tools properly, but it is equally important to have at least a basic understanding of how they work. In addition, skills are essential to respond to changes in their life and work and to use them constructively. This can be practiced and trained specifically. Social and Emotional Learning (SEL) is one way to strengthen those skills. Many parents and educators still see it only as a way to bring peace and order to a classroom. In secondary schools, SEL is often integrated into the curriculum of the lower levels as "learning to learn" or "orientation."

But SEL means much more. Within the framework of SEL, young people acquire behaviors and attitudes that help them deal with change and act to find solutions, such as critical thinking, problem-solving skills, teamwork, and self-initiative. In the long term, these skills will not only help them achieve greater success in their studies and work life, they can also have a direct impact on their level of personal satisfaction. The 2016 joint study by BCG and the WEF "New Vision for Education: Fostering Social and Emotional Learning" showed that China and South Korea have a particularly strong understanding of the importance of SEL compared to the United States or the United Kingdom. In China, 80 percent of parents believe that SEL increases the likelihood of their child having a happy adult life. In the United States, only 66 percent hold this view.

For social and emotional learning, the use of digital components means a decisive step forward. Headsets enable communication in a multilingual environment. Virtual reality applications are also conceivable as ways to promote creativity and create a completely new learning experience.

To train teamwork, many digital education applications specifically require group work, student-to-student learning, or student feedback. This makes it possible, for example, to create documents, worksheets, and presentations as a team. Programs based on games such as STMath use representational visualizations to help students understand mathematical concepts. Interaction tools can also promote the development of creativity, curiosity, and perseverance. A special version of SimCity, SimCityEDU Pollution Challenge, helps students develop critical thinking skills and understand the relationship between cause and effect.

One of the key building blocks of an education system is a continuous assessment that documents the success of education in all institutions and across all age groups based on clear criteria. Online learning tools allow teachers to have a detailed overview of how much time each student spends on lessons and with what level of success. Accordingly, the educational content can be adapted to the learning success of each student.

The widespread use of online tools would make performance measurements such as the PISA study much easier, so that the best teaching and learning models can be disseminated faster.

A NEW VISION FOR EDUCATION, digital learning methods, and adaptive content can make it possible to achieve genuinely equal opportunities. Because education is the key to personal development and individual happiness. Our job is to significantly improve this key.

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