

# Is EdTech addressing the demands of 21st century education?

EDTECH

21ST CENTURY SKILLS

EDUCATION

Whether it concerns corporate learning or the education of our youngsters, digital technology is expected to transform education in terms of efficiency, affordability, accessibility and effectiveness. At the same time, the Fourth Industrial Revolution and the resulting changing demands of the digital era are forcing policymakers and caretakers to reconsider the focus of education. Knowledge transmission can no longer be the core purpose of education, but the desired focus on higher-order thinking skills is still highly contested from a pedagogical point of view. What does EdTech offer in this context?

## Our observations

- Global Education is currently a \$6T industry expected [to reach \\$10T by 2030](#). The global spend on education has increased at a 5,2% CARG over the past 10 years, with spend per student increasing 4,1% according to [Goldman Sachs](#). However, the increased cost of, for example, higher teacher wages, does not lead to productivity gains, as is often the case in other sectors when wages (the so-called [Baumol's costs disease](#)).
- The main costs of education are staff costs (e.g. 75% for K-12 stage), building/maintenance and educational materials. Goldman Sachs expects that technology can lower educational costs by 20%-30%, mainly by improving students' academic achievements through adaptive learning programs, reducing real estate costs and allowing teachers to reach more students through online learning.
- The U.S. was considered the [leading country in EdTech](#), the market is worth over \$8.38 billion dollars and in [2015](#), 60% of the money invested in EdTech was invested in the United States. However, [China is competing for this title](#), since in 2018, Chinese startups received over 50% of all the capital invested by venture capitalists in EdTechs worldwide. Chinese EdTech companies received more money than the total amount invested in EdTech firms from all other countries combined. [Beijing](#) is considered the world's preeminent hub for EdTech, because an unparalleled number of EdTech companies are headquartered in the city.
- One of the most revolutionary aspects of EdTech is its possibility of offering [education that is personalized](#)/adaptive to each student's needs and capabilities. [Knewton](#), for example, is an EdTech company that develops technology to collect data on students as they complete tasks, recording their learning preferences, strengths and weaknesses. It then creates personalized lessons for each student to maximize learning. Arizona State University claims it experienced a [17% increase in pass rates](#) after implementing this technology into its math courses.
- As we wrote before, the changing future of work is creating [demand for 21st century skills](#) and technical skills. As [Andreas Schleicher](#), head of PISA (OECD), puts it: "The world economy no longer pays for what you know; Google knows everything.. The world economy pays for what you can do with what you know."
- Technical skills such as coding are pretty straightforward when it comes to teaching and examine them. [Makeblock](#), for example, is an EdTech company that offers programs to children and schools worldwide to teach such skills. Currently, it has over 4,500,000 users worldwide. However, there is still much (pedagogical) debate on how to teach 21st century skills such as creative thinking, critical thinking or problem-solving skills and how to examine them.



## Connecting the dots

The implementation of digital technology in education (EdTech) might evoke a lively picture of the future of learning, with children or employees being [educated with the help of VR-sets](#), augmented reality programs, [YouTube tutorials](#), [personalized competence-based learning](#) or learning through computer games. When students are introduced to such new learning methods, it is evident that they will become more tech-savvy than when they are taught in a more traditional classroom setting with blackboards and so-called talking heads for teachers. In this sense, the implementation of technology in education will better prepare students for a world in which technology is omnipresent. EdTech furthermore offers promising programs to master some desired technical skills such as coding or engineering, which inevitably demand the use of digital technology in education. Finally, the solutions EdTech promises are very compelling, such as adaptive learning that enables students to achieve their maximum potential, efficient use of teachers, reduction of real estate costs, improving accessibility, etc. EdTech therefore has the potential to bring about a revolution in education delivery (e.g. who educates and where) and learning methods (e.g. how something is taught). This hopeful picture translates in the [growth expectations](#) of, for example, spend on VR/AR (from 1,8B in 2018 to 12,6 in 2025) or AI (from 0,8B in 2018 to 6.1B in 2025), mostly in non-accredited and corporate sectors. Yet, EdTech is still in a [trial and error phase](#). Moreover, the successes or failures of EdTech applications are often [perceived differently](#) by different parties or studies. Knewton's tech applications, for example, while reported by Arizona State University to be successful, were [highly criticized](#) in an article in Forbes. It might therefore take a while before EdTech applications are granted a definite place in education. Yet, simply because it expands the possibilities of teaching in general (e.g. gamification, any time any place, learning through (VR) experience), it will be of use in teaching delivery and teaching methods one way or another. Currently, [the most promising applications](#) are intelligent tutoring systems, automated essay scoring, and early warning systems that detect when students drop out of school, are victims of bullying or when otherwise worrisome behavior occurs.

The opportunities as well as the hesitations of implementing EdTech in education are a hot topic. However, whether EdTech is addressing the changing demands of the digital era is a rather underexplored subject. It might wrongly be assumed that, since EdTech will make students more tech-savvy, they will automatically meet the demands of the digital era. Being more tech-savvy, however, is only one demand that comes with the digital era. Mastering technical- and 21st century skills are viewed equally important. A closer look at EdTech and its content shows that it is primarily focuses on traditional knowledge subjects such as math, history, language or geography. This is not surprising, since these subjects have been taught for centuries, there are proven ways to teach them, their content matter is clear, and there are solid ways to examine them. The urgently needed, newer (21st century) skills such as critical thinking, creative thinking and problem-solving, on the other hand, are relatively new territory. There are no solid methods yet to teach them, nor is there consensus on how they should be examined. Some even go as far as arguing that [skills are always context-dependent](#) and are not transferrable to other contexts. In other words, it will not be possible to teach these skills separately from knowledge education, and even if students master them in one (knowledge) topic, it is not likely that they can apply them in another. This implies that the education of 21st century skills will be in vain if they are educated separately from the subject they are [wanted](#) for (e.g. data analytics, creative business model development, information management, etc.), and need to be implemented in (school) topics that specifically address these (new) disciplines. This seems unfeasible since there are so many new disciplines that demand 21st century skills and consensus on this matter is still at distance. Due to the fact that we are still unable to meet some important contemporary educational demands, as there is no consensus yet in terms of teaching methods and examination, for now, EdTech cannot prove its value in that area any more than the more traditional education methods can. From this perspective, EdTech is mainly revolutionizing the educational methods and delivery that are applied in traditional, knowledge-oriented subjects.

## Implications

- One of the biggest points of discussion on educating 21st century skills such as critical thinking, creative thinking or problem-solving is that they cannot be educated without certain foundational knowledge that must be mastered by students. And since current curricula are already highly occupied with knowledge transmission, it seems unfeasible to add substantial new subjects to school curricula. However, if EdTech proves to offer more efficient ways to teach knowledge-oriented subjects such as math, history or geography, then this would partly relieve teachers of this task and their time could be spent on practicing 21st century skills instead. Especially since [the prospective strengths of EdTech](#) do not lie in teaching higher-order thinking skills, which are still considered to be something only humans can teach.
- Because of the uncertainties concerning the success of EdTech in educating our youngsters, it is understandable that the implementation of its new learning methods in school curricula will take some time. After all, no parent or policymaker is willing to experiment with the future of their children. However, in countries where educational facilities are poor, the applications might be an improvement in education regardless (e.g. [Africa](#) or [India](#)).
- Furthermore, since the demands of the digital era are more urgent in the current domain of work, [corporate learning](#) might be more willing to make use of the possibilities of EdTech, because of its scalability and lower cost compared to traditional upskilling programs. Moreover, the consequences of a failing EdTech application are less severe for adults than for children whose cognitive development is still not completed.