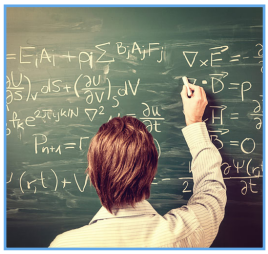
Trends



Education 2020

Step into the classroom in 2020 and see powerful forces at play. A global shortage of skilled talent propels career-focused learning. Virtual learning, digitization, and augmented reality have made our old definitions of a classroom obsolete. Evolving learning needs redefine what education means, who delivers it and how. Students become teachers, learning from one another through project-based learning and self-organized learning environments. Education funding shifts to pedagogical approaches proven to work via real-world trials. Unbundled, personalized, and dynamic education is the new normal.

The classroom of the future

Digitized classrooms

Digital technologies pervade almost every aspect of the classroom, with enhancements such as desk-sized screens, tablets that track eye movement and thus attention, performance dashboards, object-embedded intelligence, and interactive whiteboards.

The global mobile education market grows to $37.8 billion in 2020, up from $3.4 billion in 2011.

The maker classroom

3D printing makes its way into the classroom, allowing students to transform their ideas into actual models and test them, a practice already followed in manufacturing. 3D printing fosters creativity, innovation, and an interest in science and math. By 2020, the classroom has evolved into a creative space enriched by 3D printing, robotics, and real-time collaboration with community startups.

3D printing company Makerbot is crowdfunding an effort to put a 3D printer in every school in the United States.

Virtual laboratories

Students perform physical science experiments virtually, with nothing more than Internet access. While these applications can't replace all real-world experiments, they can provide extra practice, guidance, and safety at a considerably lower cost. They also allow students to learn by making mistakes, sparking interest in the scientific method.

Classroom or playroom? Now it's both

More and more schoolwork is game-based, allowing students to learn through playing, building, and discovery.

Playmaker, a Los Angeles-based school, incorporates gaming into its curriculum. In the "maker" space, students construct Rube Goldberg structures and make video games or machines. In the "imagination" space, students and teachers tap into their own interests and imaginations to develop ideas and projects. Large group activities, facilitated by multimedia, are conducted in the "adventure" room, such as historical role-playing scenarios and collaborative video gaming.

Education technology mash-ups

The mash-up of different technologies such as robotics, 3D printing, and programming results in big changes in education. Organizations emulate the approach of Play-i, which is crowdfunding its robot Yana (which stands for "you are not alone"). An interactive iPad app teaches kids to program the robot to perform simple tasks. The objective is to make kids the creators and directors, not just the consumers, of technology. Over time, kids will build their own complex tasks and moves for the robots and share them with the broader Play-i community.

The augmented classroom

Augmented reality (AR) applications become a common feature of interactive learning in schools, transforming a static learning experience into something immersive and dynamic. For example, instead of looking at diagrams in a book, a student learning about the human circulatory system points an AR-supported device at a classmate to visualize her heart beating.

PBS released a new augmented reality application for its math series Cyberchase. Funded by the US Department of Education, the Cyberchase Shape Quest mobile application helps children develop their geometry, spatial reasoning, and problem solving through math-based games in an augmented reality environment.

Next-generation teachers

A new teacher-student relationship

Telepresence, algorithm-generated lessons, teacher assignment algorithms, assessment algorithms, mobile learning platforms, and student-to-student teaching platforms all become part of most classrooms in developed countries. Overturning traditional teacher-student models, these technologies allow teachers to focus on teaching while artificial intelligence helps personalize the lessons.

Robot teaching assistants

Classroom robots learn from every interaction with humans and accumulate knowledge. Fully autonomous, guided by artificial intelligence software, and features such as motion tracking and speech recognition, the robots help young students learn simple skills while adapting to their psychology. For example, no child likes to admit his or her own mistakes but may be happy to correct someone else's; robots can be programmed to make carefully calculated errors when working with students, who learn while correcting them. Robots won't replace human teachers; instead they serve as effective teacher helpers.

Sandra Okita, an assistant professor at Teachers College, Columbia University, has programmed her robot "Projo," to make carefully calculated errors when working with students. As students point out those errors to Projo, they consciously avoid making similar mistakes in their schoolwork.

Rise of the hybrid teacher

The career path for teachers evolves. Many teachers increasingly serve in hybrid roles, teaching in the classroom half the time and devoting the rest of the day to activities such as researching teaching methods, coaching teacher candidates, or working with district administrators on community outreach programs.

A 2013 MetLife survey found that 25 percent of teachers were interested in a role combining teaching and some sort of leadership position; yet 84 percent were either "not very" or "not at all" interested in becoming a principal.

Teachers who can "read minds"

Face-coding algorithms help teachers learn from students' facial expressions. They can know when students are confused or struggling with a concept, and even gauge the expressions of autistic children. Facial coding also improves online education. Advanced neural headsets will allow teachers to actually "read" students' minds—a red beeping light warns of students whose focus and attention have dropped below acceptable levels.

Affectiva, a start-up from MIT's media lab uses its software, called Affdex, to help understand the facial expressions of autistic students. With over one billion facial expressions in its database, the software analyzes facial cues to determine underlying emotions.

The evolution of learning

Personalized learning for everyone

In the online world of 2020, students have unprecedented access to learning resources around the globe, largely without reference to barriers such as time, location, and institution. Academic analytics and facial coding technology are built into online learning environments, enabling real-time assessment and personalization of content. Most students have their own digital learning profiles recording their skills, knowledge, and credentials throughout their lifetimes. These profiles are updated automatically based on learning and career experiences.

AltSchool, a San Francisco based K-8 school, aims to redefine the education industry by leveraging technology to offer personalized learning experiences. At AltSchool, students help develop their own personalized learning plans through a '3P' process—a learner profile, a personalized learning plan and a playlist (playlist is a weekly list of activities to be performed). Depending on a student's interests and passions, playlist activities can range from solving mathematical problems to developing 3D prototypes of products. Technology plays a central role in personalizing learning experiences as student profiles, playlists, and milestones are recorded on a mobile device. For assessment, the school uses computerized tests that are adjusted based on an individual's skills.

Self-organized learning environments (SOLE)

Self-organized learning environments (SOLEs) give students more control over what and how they learn.

Cognitive calibration in the classroom

By 2020, students at the best schools each have cognitive profiles that inform their individual learning plans. Uncovering this information is relatively expensive, however, and wealth disparities create disadvantages for some.

Education researcher Sugata Mitra gave children access to a computer and the Internet through a space in the wall of his office in a Delhi slum. He saw how the children, despite not speaking English or even attending school, taught themselves how to find information they needed online, accidentally discovering interests such as genetics. His concept of a "school in the cloud" is essentially a computer lab open to children that allows them to explore their interests, supported by the encouragement of online volunteer mentors who intervene when needed.

The student becomes the master: Peer-to-peer learning

Students learn from each other through project-based learning and collaboration. Students who test well for personality compatibility, but have varied cognitive strengths, are paired up to support one another during the year, maintaining a constant connection amid changing peer relationships. Thanks to technology, such collaboration is no longer limited to peers in a single class, school, or country.

School systems 2.0

Marketplaces for learning

Educational markets grow both within and outside public school systems. With the democratization of entrepreneurship via crowdfunding platforms, incubators, startup mentor networks, and innovation summits, the education ecosystem sees a burst of new ideas, technologies, and learning models.

Unbundled education

Many jurisdictions see the "unbundling" of education, the breakup of the composite structures comprising schooling today. Schools take on the role of a connector or general contractor and convene different organizations that excel in teaching various subjects, rather than every subject. This allows teachers to specialize and bring a higher level of expertise; a teacher might, for instance, be hired to teach human anatomy to eighth graders, rather than general biology to all middle-school grades. These freelance "teacherpreneurs" rotate between multiple schools. The unbundled education system provides greater room for creativity, taking the basic elements of education and reassembling them in a way better suited to the evolving needs of learners.

See GovCloud.

Next-generation apprenticeships

The success of apprentice programs in Germany and Austria, together with the ballooning cost of college, drives the growth of modern-day apprenticeships. Apprenticeships evolve in terms of how they are delivered and become more accessible through the use of technology. For example, the State Department's Virtual Student Foreign Service employs college students remotely as "e-interns." Private businesses and government agencies increasingly offer tailored programs to help train and employ skilled high-school students. Multinational corporations disseminate successful apprenticeship models to other parts of the world.

Industrial giant Siemens brings German-style apprenticeship to the United States, offering high-school graduates a free technical education and a job.

Today apprentices make up only 0.2 percent of the US labor force, far less than in Canada (2.2 percent), Britain (2.7 percent), and Australia and Germany (3.7 percent).

School-business collaboration

Schools and businesses co-produce programs teaching job-specific skills, integrating formal education and employment. Education in 2020 also blends adult retraining and youth education—companies send employees who need retraining back to school with kids learning the skills for the first time. Co-learning fosters the exchange of practical wisdom and fresh ways of thinking between both groups.

New York's Pathways in Technology Early College High School (P-TECH) offers six years of "high-schooling," after which students graduate with an associate's degree—and a guaranteed job with IBM. The company sends full-time staff to ensure the curriculum teaches kids the skills it seeks.

Tomorrow's curriculum

From textbooks to flexbooks

The students of 2020 play a role in the creation and construction of their own learning materials. Heavy, expensive, and quickly outdated textbooks are replaced by cheap, easy-to-update, interactive, digital "flexbooks." The authors of digital texts often are teachers—and sometimes students. With project-based learning, students and teachers around the world become the source of more and more open-source materials.

Kindergarten coders

Building on the cognitive skills of digital natives and "iPad babies," children are introduced to coding for computers early—preferably in elementary school. Curriculum and teaching methods evolve quickly to keep pace with the continually advancing needs and abilities of even the youngest learners.

Estonia has begun introducing children as young as six to the basics of coding.

New definitions of literacy

The rapid acceleration of technology gives rise to new dimensions of literacy. Because new technologies engage the learners' senses and offer a more immersive learning style, literacy becomes defined by critical thinking, creative thinking, calculation, and "compspeak"—the skills needed to access information using computers equipped with natural language recognition. Schools in 2020 also teach emotional and social intelligence. Equipped with a deeper understanding of themselves and others, students more easily transition into adulthood and seek out career paths best suited for their cognitive strengths.

Museums as learning hubs

In 2020, museums are vibrant places that constantly experiment with new ways to use their collections to enhance learning. With technologies such as augmented reality, sensors, and 3D printers, museums provide students with an immersive learning experience on topics including history and science, while also teaching skills such as teamwork. Museums and other public spaces act as equalizers, giving everyone access to the same learning resources and technology.

Educators at the Smithsonian's Cooper-Hewitt, National Design Museum have been introducing New York City schoolchildren to how designers approach problem solving—through open minds, teamwork and with an appreciation for detail. The program has been so well received it is being expanded nationally, training teachers from across the United States to deliver the workshops themselves.

Higher education

Rethinking career pathways

Rather than allowing the latest list of rankings to guide their college decision-making, students instead start with the end in mind: What do I want to do? Thanks to organizations such as LinkedIn, which provides free access to aggregated education and career data from its vast network of members, it's never been easier to map the career pathways of hundreds of millions of professionals so that students can reverse engineer the college decision-making process. Rather than "Where do I want to go?" as the jumping-off point, students instead start with their desired career outcome in mind and can study the varied paths other professionals took, including the skill sets required for success.

College for America, University of Wisconsin, and Western Governors University (WGU) use technology to scale competency-based education to more students. College for America students, for instance, can earn an associate's degree in as little as 100 days for $2,500 or a bachelor's degree in just two years for $10,000.

A shift from credit hours to competencies

Competency-based degrees emerge as a popular alternative to traditional degrees awarded on the basis of completing a certain number of credit hours. Competency-based degrees are self-paced, reward prior experience, and measure learning through demonstrated proficiency, making them very attractive to students seeking a degree from a well-recognized institution at a fraction of the cost of an equivalent in-person degree—and with less time spent out of the labor market.

After HackReactor students complete three months of training, they secure jobs at Silicon Valley-based firms, with graduate salaries averaging more than $110,000.

Design your own career pathway

Alternative education providers such as HackReactor, a San Francisco-based "bootcamp" focused on teaching computer programming in an immersive training environment, offer students an accelerated path for acquiring in-demand skills sought by employers. Thanks to a growing ecosystem of such educational providers, students in 2020 have many alternative pathways for upgrading their skills and advancing their careers.

Stackable educational credentials

As alternative education providers proliferate, businesses need a means of comparing the relative merit of various education credentials (for example, how does a 12-week general assembly course stack up against a four-year college degree?). In 2020, it's possible to make quick apples-to-apples comparisons across an increasingly diverse educational landscape, enabling employers to assess the rigor of each individual's unbundled education.

Education technology start-up Degreed assigns scores to a full range of educational opportunities, from massive open online courses to college degrees to corporate training.

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