

The Future of Education

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ABSTRACT

Although educators and leaders create, design, and imagine the future, technology is changing how students learn and teachers teach. The future of education must keep up to date with the dynamic nature of the 21st century. It is expedient to take stock of the past in order to look forward, imagine and plan for a better future. Today, we take a look at education and how social, economic, and technological changes will revolutionize the way children, youth, and adults go to school. The future of education lies in harnessing technology to make us learn quicker, memorize effectively, and teach better. Without doubts, education today is not what it was even five years ago, and the future of education will look significantly different than it did a decade ago. This paper addresses how higher education institutions and K-12 schools can best prepare students for the future.

KEYWORDS: *learning, teaching, education, futures, online education, digital education, online education, technology*

INTRODUCTION

Quality education is one of the pillars of the United Nations 2030 Agenda for Sustainable Development, which aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Education is key to the future quality of human life and the sustainability of the world. Education can make all the difference in people's lives. It has a catalytic effect on the well-being of individuals and the future of our planet [1]. Education encompasses elementary, middle, and high schools, colleges, universities, apprenticeships, adult education, special education, etc. Education helps individuals escape poverty and increases their quality of life. Education matters for economic growth and power. As Malcolm X said, "Education is the passport to the future, for tomorrow belongs to those who prepare for it today." As technology advances and becomes more complex, the quality of education becomes more important than ever.

Our world is changing fast and the days of a "job for life" are gone. Although the education industry is booming as a result of a growing global population,

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the traditional model of education has remained largely unchanged since the 19th century. Although the pencil has been replaced by an iPad and the chalkboard by the dry-erase or SMART board, it is still the same old story. In today's classroom, students still sit in rows reverently listening to a guru at the front, half of the students are bored while half are lost. If learning is a chore and boring then the most important driver of human learning, inspiration, or passion, is disengaged.

The role of education has never been more critical. Many forces are influencing the future of education. Globalization, internationalization, interconnectivity, personalization, customization, and digitalization are transforming every aspect of our society, including education. To meet global expectations, education systems should prepare for the inflow of students from various backgrounds, socio-economic classes, and cultures. Students must develop global citizenship skills and be aware of the wider world. Internationalization enables institutions to have multiple sister campuses around the world.

Institutions can have a global presence by just having their courses online. Interconnectivity changes education since human connections and interactions are at the heart of education. Students prefer a user-friendly, personal, and customizable way of learning. Digitalization has come to stay in education, and we can no longer ignore it. It will completely transform education. These forces are providing us with several new opportunities for human advancement.

The pandemic exposed a need to rethink how systems leaders design schools, and instruction, and whom they put at the center of that design. The future of education can be summarized as follows: (1) future of technology, (2) future of learning, (3) future of teaching, and (4) future of online education.

FUTURE OF TECHNOLOGY

Technology is transforming how we live, work, play, think, buy and sell, and worship. It has become a key to success for different sectors. New technologies that are being introduced today are eventually filling the spaces. Technological advances in education are helping to make teaching a career with an excellent future. Due to technology, education has become accessible in various villages, towns, and cities. Technology-related skills are increasingly in demand. Understanding how technologies work, what they do, and their potential for benefiting society is critical to a child's future. The following technologies are poised to play an integral role in the future of education [2]:

- *Artificial intelligence (AI) and machine learning (ML)*: These are now transforming classroom experiences in schools and colleges around the world. AI (or machine intelligence) can contribute to a 24/7 learning environment for students that achieves a deep level of personalization of how they learn.
- *Cloud computing*: It will grow with increased Internet access, leading to an explosion in the amount of data that a classroom generates and has access to. The birth of cloud-based computing and virtual learning platforms enables decentralized learning.
- *Digital Textbooks*: Students need not carry textbooks around but a tablet or a gadget with digitalized versions of textbooks stored in them. Open textbooks are digitalized textbooks in print, e-book, or audio format.
- *3D printing*: Students tend to learn faster and understand a subject better using 3D printing.
- *Virtual reality (VR) and augmented reality (AR)*: These are growing like crazy and are popping up

in education. Encouraging their use has helped the learners have complete and unrestricted access to minute details. Imagine wearing an AR headset that is able to superimpose educational lessons on top of real-world experiences, as typically shown in Figure 1 [3].

- *Social media (or social networking)*: This refers to any technology that facilitates the dissemination and sharing of information over the Internet. The key purpose of using social media tools is to engage students through electronic means, facilitate professional communication, improve student comprehension, enhance student networking, and enable collaboration with other students around the globe. Popular social media include Twitter, Facebook, Instagram, SlideShare, Telegram, and YouTube.
- *Robots*: They have the potential to revolutionize education. They can improve the quality and effectiveness of learning and teaching. A robot may be used as a teaching assistant as shown in Figure 2 [4].

These technologies are changing the way we work and live in almost every area of life. They have transformed education. Although technology should be used in service rather than dictating, our future major challenge relates to how students use technology. Technology is not a silver bullet solution. Technology will transform education by giving teachers and students a variety of new tools to work with. For example, tools for 3D models and visualizations already exist; now we just have to make them work at scale in the classroom. A science class may cover 3D printing and how it can be used to replicate prosthetic limbs. 3D printers allow students to work with mini models to test out engineering design principles. Games can augment learning and stimulate critical thinking. Learners are naturally gravitating toward video. Education is being transformed in both formal and informal learning contexts by digital technologies.

FUTURE OF LEARNING

The traditional art of learning has witnessed a huge change with the introduction of technology. Today's learners are digital natives, who are heavy users of mobile devices. They are accustomed to getting information in a user-friendly, personal, and customizable way. The formal classroom will be replaced by learning areas that allow small groups to collaborate face-to-face or virtually on learning projects, as illustrated in Figure 3 [5]. The future of learning depends on finding the right match between technology and teaching. Education apps are also crucial to the future of learning.

The future of education is all about strengthening and incorporating student-centric learning. This is achieved through the following learning schemes.

- *eLearning*: Technology has revolutionized everything. eLearning is a modern form of education that enables learning with the help of electronic technologies. It requires just a computer and the Internet. It may also be termed distance education, distance learning, online learning, Internet learning, etc., but all these refer to the same thing. eLearning has transformed the landscape of education due to its convenience for students and teachers. eLearning is here to stay. Organizations also are adapting to eLearning courses to train their employees. eLearning is the future of education because it provides continuous learning, social learning, on-demand learning, gamified learning, and personalized learning path. It has mitigated various problems associated with learning [6].
- *mLearning*: Mobile learning is the future of education because it is flexible; it allows students to learn anywhere at any time. Brick-and-mortar classrooms do not allow mobility. Today's students are juggling multiple jobs, and employees are now becoming more comfortable with deskless and remote settings. As shown in Figure 4, most digital natives have smartphones and tablets [7]. Learners prefer navigating mobile learning apps and platforms to access their training materials.
- *Project-Based Learning*: This is a teaching method designed to allow students to develop knowledge and skills through engaging projects. It involves active learning and a deeper engagement, better preparing students to be creative and innovative in a project-based world. Creating immersive areas in schools promote creativity and collaboration in an immersive learning environment. Students can immerse themselves in whatever subject they are learning about with augmented reality (AR). Project-based learning helps learners understand how the ideas we teach work instead of just memorizing and repeating facts [8]. As careers are adapting to the future freelance economy, students of today will adapt to project-based learning.
- *Industry-Based Learning*: This is a learning approach to education where subjects are taught in the context of industrial applications and experiences in a commercial environment. This may include field trips to industries, interviews with industry experts, completing internships, etc. [8].

- *Personalized Learning*: Technology allows us to create education that is tailored to the individual, universal in nature, and decentralized in structure. Since not everyone learns the same way, personalized learning adjusts to each student's pace and style of learning. It may eventually help us to ensure that every student finds their path to success. Students are given the opportunity to make independent choices, to think and to face challenges. Students will learn with study tools that adapt to their capabilities. Students who experience difficulties with a subject will get the opportunity to practice more until they reach the required level. For students with disabilities, new technologies mean empowerment, putting them on a more equal footing with their classmates.

FUTURE OF TEACHING

The traditional role of an educator is to be a facilitator, or a guide, rather than a classroom manager. With the rise of technology, the role of educators has undergone a permanent evolution. As technology evolves, educators are supposed to be updated about changes and introduce them to students. As education changes to suit the future's needs, the role of educators must adapt and grow. Educators need to equip today's young generation with the skills to thrive in tomorrow's world. Future teachers will have to face the reality that students prefer to learn in a flexible, personalized format, in a technology-focused classroom. They must adapt to changes and change what they teach to meet the needs of 21st-century learners. They must be prepared to be data collectors, as well as analysts, planners, collaborators, curriculum experts, synthesizers, problem-solvers, and researchers. An educator now embodies a multitude of new roles: learning manager, subject matter expert, instructional designer, technology architect, multimedia developer, e-learning developer, support specialist, learning facilitator, etc. [9]. Educators will be increasingly challenged to find new ways to engage learners. Good educators derive both extrinsic and intrinsic rewards from teaching.

Educational systems and education worldwide must adapt and embrace digitization. The digital educator (or an online educator) is one who knows how to use digital tools to help them simplify their work, improve classroom interaction, and make an assessment. Digital solutions can allow educators to better serve students and unlock their full potential. Teachers use digital technologies to augment, not replace, traditional face-to-face-teaching. They should be helped to figure out how to use the right technologies at the right time to do the right job for

students. Then they will be able effectively to prepare students for the future. Technology can be used to provide dynamic tools for monitoring student achievement. For example, integrating short videos into a lesson plan makes it easier to engage students. So, teachers will need to prepare kids to work collaboratively with machines.

Future educators should have the following priorities [9]:

- Embrace a growth mindset
- Be able to adapt fast to emerging technologies and teaching strategies
- Thrive in collaborative and dynamic environments
- Be student-centric, not system-centric
- Be a mentor who guides students through practical skills
- Be a coach who inspires students to reach their full potential
- Be able to design and carry out meaningful and deeply engaging learning experiences

FUTURE OF ONLINE EDUCATION

The education industry was taken by surprise by its forced transition to digital education, also known as online education, distance education, or remote education. Remote education is already a big thing, with millions signing up for online courses. The popularity of online courses has increased over the past decade, and the global online learning market is rapidly growing. Online education has expanded drastically over the last year due to school closures from COVID-19. By 2050, the majority of students worldwide may not need to physically go to school in order to get education. From the convenience of their home, they will join students from all around the globe and engage in various virtual activities. Online degree programs can provide an added layer of personal perspective for how students and teachers can leverage technology in education. Distance education already plays a crucial role in providing access to education for millions of people in the developing world. It offers extensive resources ranging from videos and tutorials to seminars, webinars, online libraries, educational websites, and more.

The appeal of online education continues to increase due to its comfort and accessibility. Its flexibility enables students to obtain the education they need in affordable and convenient manner. Online education is more cost-effective than brick and mortar schools. Other advantages of online education include the following [10]:

- Online learning offers convenience and flexibility
- High-quality student-tutor interactions

- Studying online is affordable for many people
- All age groups benefit from online learning
- More students can be enrolled
- There's a vast amount of online learning resources
- Web-based learning will grow in popularity

In western countries, the launching of online course provider platforms such as EdX, Coursera, and Massive Open Online Courses (MOOCs) has brought the concept of distance learning closer to learners across the world. MOOC is an open online course that allows anyone to register without time limitations, geographic restrictions, or prerequisites. The proliferation of MOOCs and other forms of e-learning will replace traditional distance education. With thousands of enrolled students, MOOCs will radically change the way education is taking place. MOOCs will change the landscape and make this a global market [11]. It is needless to say that not everything can be taught online.

At the heart of lifelong learning is the notion that students deserve a personalized experience that can weave into their daily life and help them achieve their long-term goals. Online education has a major problem; there is no physical activity.

CHALLENGES

Education is a controversial issue because it is either a unifying social force or a divisive one. Parents quarrel about the quality of education for their children, the society is divided about what to teach children, and the government is concerned about the increasing cost of education. Rising costs are no longer easy for governments and students to pay for them. Who should provide laptops for students? The government or parents? If a parent is still struggling to pay rent, Internet access is not a major concern. We live in a competitive world, where kids experience a lot of pressure to perform. When they fall short, they feel deflated. Lack of high-speed Internet services in remote areas is a challenge.

Technology is challenging traditional teaching and learning techniques. Educators need to think critically about how to deploy technology strategically. Although educators want the best for their students, the behaviors and knowledge required for students to succeed are rapidly changing. Can our future education system produce leaders who are able to cope with the complexities of tomorrow? [12].

After two years of virtual learning, many students are still playing catch up. For example, in California, the budget situation today is nothing short of disastrous. Teachers in elementary/middle and high schools are overwhelmed and overworked. Good teachers are

leaving because they are not well paid. This gives concern and worries about the future of public education in California. The community, parents, and students are increasingly pessimistic and they question the value of public education. Inequities are getting worse [13]. Lawmakers and schools need to replace the traditional business model in a way that can subsidize costs and save students and parent loan debt. Figure 5 shows some activists protesting that education is not for sale [14].

Many countries chose to change the way students learn after covid 19. Instead of traditional education, many students and instructors join virtual spaces with online meeting platforms such as Zoom, Google meets, Microsoft team, etc. Education policy has for too long been restricted by short-term thinking.

These challenges look daunting, but many education systems are now well on their way toward finding innovative responses to them.

CONCLUSION

Education is essential to any modern society and can influence its future. Today's education trends are shaping tomorrow's workforce, which will require youths to be competent in a broad range of transferable skills such as problem-solving, critical thinking, creativity, and communication. Technology can be a powerful tool for transforming learning and teaching. The practice of a teacher standing in front of a room full of students is increasingly becoming a thing of the past. The introduction of e-books, digital textbooks, online learning, and electronic/mobile devices is rapidly changing the education sector.

The evolution of education brings with it future trends in education, which should be closely linked to education for sustainable development. Although the future is uncertain and hard to predict, we need to be ready for it. There are often multiple versions of the future; some are assumptions, and others are hopes and fears. In the future, education will become more intelligent, safer and more secure, more relevant, and intertwined with jobs of the future. The future of education will much more flexible, modular, and online. More information about the future of education can be found in the books in [15-24] and the following related journal: *Frontiers in Education*

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Figure 1 Wearing an AR headset [3].



Figure 2 A robot is used as a teaching assistant [4].



Figure 3 The formal classroom is replaced by learning areas that allow small groups to collaborate face-to-face [5].



Figure 4 Most digital natives have smartphones and tablets [7].



Figure 5 Some activists protesting that education is not for sale [14]