

IS E-LEARNING THE WAY OF THE FUTURE IN EDUCATION?

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Abstract:

Technology has been a part of our educational systems for more than a decade and has been reshaping it constantly. From computer aided presentations, to online libraries, to online courses, the information technology has been offering the opportunity to access knowledge from virtually any point on Earth. The use of online learning platforms makes learning more attractive for the students and for the younger generations, in particular, that embrace technology and all its benefits, far easier than anybody else. After the Covid-19 outbreak in March 2020, humanity had to shift from the offline everyday life to the online everyday life. The educational system was no exception and had to adapt from face-to-face teaching to online teaching, a shift which, for the majority, was not an easy task to do, at all the levels: economical, logistical and, of course, technological. The online teaching also revealed a series of shortcomings, that were unheard of in the offline teaching system and they had to be overcome, as fast as possible, in order to reduce the interruption in the students' learning. The conclusion of the article will reveal that the tech-aided learning, although it has its challenges, will prevail even after the pandemic, as all its benefits will widely spread in the educational system throughout the world.

Keywords: technology, e-learning, education, pandemic.

1. Introduction

Education can be defined, in a simple way, as the interaction between two or more persons, one being the teacher/educator/trainer and the other(s) being the pupil(s)/student(s)/trainee(s). The purpose of this interaction is the flow of knowledge from one person to the other.

This process has been done almost the same way since the times of the ancient Greece, where two opposing ideas were presented in order to make people take sides and offer arguments for their ideas. Moreover, even the spaces where the educational process took place were organized in the same manner, to give the professor/trainer/educator the main role.

During recent years, technology slowly emerged into the educational process, into the classrooms, which started the change in this centuries old system. The first influences started during the late 90s, early 2000s when online forums and messaging boards took the educational system by storm as they brought together the demand and the offer for knowledge. The biggest advantage was that the information could be easily accessed

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virtually from any place in the world, with just a monthly subscription to the local internet provider. The downside was the reader had to have some basic knowledge of that particular subject, as the information was scattered everywhere and sometimes did not come from a reliable source, as basically anyone could post on these platforms.

2. Online or offline

At the global level, we are witnessing some fast-growing and irreversible trends at all levels of education: More and more students own and use laptops, tablets and any other mobile devices. For the students that do not own such a device the education institutions may provide the necessary tools. For the higher education levels, the majority of students own such devices.

The academic staff is using the same technology which allows far better results in the educational process as it provides more student-oriented curricula. Long gone are those days when teachers had to spoon-feed the knowledge to their students. This means the majority of time was spent on the theoretical approach instead of the applied knowledge and developing proactive skills, which is more useful in real life. Furthermore, the fact that these instruments allow access to numerous users, simultaneously, users that are not necessarily on the premises, gives students a whole new world of opportunities.

For the higher education system, the change is even more visible and the demand for a new way of learning is even bigger, as students, want to be able to access their information fast, at any given time and from any mobile device they own. Moreover, even in the classrooms the students want to use their devices as a learning tool, and they want the professors to give them this opportunity. According to Melissa Woo⁷, Vice Provost for Information Services and CIO at University of Oregon, “University libraries are being converted to learning commons with nary a book insight...” in order to create the environment the students need and want, the place where they can use the new technology to obtain all the information they need. The Vice Provost also believes that knowledge should be created online, on social media like platforms as the new generations of students spend most of their free time, surfing on the internet. As such, it’s only natural to offer them the opportunity to learn in the same environment they feel more natural.

This shift in learning spaces, where the educational process moves away from physically classroom to a virtual classroom represented by all the learning platforms is known as flipped classroom⁸. This means the professors use the classroom time to explain or to clarify the delicate aspects of the students’ reading. As a result, the learning experience is more oriented to the students’ educational needs and less on pushing theoretical knowledge.

⁷ Melissa Woo – “How technology is reshaping education”

⁸ Matthew Lynch - “Why digital learning is reshaping education”

The use of technology in education has revealed another benefit: teamwork. During the classes, as students are required to work on projects based on what they read online, they will also be inclined and encouraged even to work together in order to have better and faster results in their research. The benefit, on the long run, is that they are accustomed with teamwork, as well as with individual study, so students will better fit the labor market, after graduation.

The plethora of available information and the easy access to it ensures that education no longer means memorizing all sorts of data, but the understanding and usage of that information. The students are now encouraged to think and come up with solutions to various problems, based on the information they accessed online. This higher-order thinking is also preparing the students for the labor market demands, as it develops critical and analytical thinking skills.

As technology becomes more present in education it's only natural that digital literacy becomes part of the curricula in a continuously growing number of countries. Although during the dawn of technology, the use of a computer was considered a more or less natural skill, today it evolved into a taught discipline in classrooms throughout the globe. As such, the graduates will have the necessary tools to be able to access knowledge and, in the same time, to be more desirable to the labor market.

3. New tech trends in education.

Technology is reshaping education through a few trends⁹ that have been identified:

- Digital books;
- Multi-sensory classrooms;
- Remote learning;
- Adaptive learning technologies;
- Virtual reality and augmented reality;
- Artificial intelligence.

The identified trends are considered to be present in most countries where technology has been involved in education. Moreover, these trends considered to be irreversible as the benefits far exceeds the shortcomings.

Digital books. The digital textbooks are taking by storm the classrooms throughout the world as they are far more attractive than the old printed out textbooks. By using digital

⁹ Amol Arora – “7 Technology Trends Reshaping School Education”

books, the need for constant printing (as the textbooks need to be updated periodically) is reduced as well as the costs for printing as well as the need for paper. So, the digital books have only advantages when compared with the printed copies.

Multi-sensory classrooms. The new technology allowed schools and universities to take the classroom learning environment from a dated way of education to the future. The technology used is the interactive whiteboard that fully supports all types of learning: video, audio and kinesthetic. These whiteboards offer a more attractive learning experience for all segments of education.

Another consequence of reshaping education by technology is the fact that the classrooms themselves have to be redesigned in order to allow students to benefit from the mobility that the technology offered them.

Remote learning. As courses become available online through different platforms, the need for physical attendance in the classroom becomes less important. Classes and courses can be accessed virtually from any point on Earth as long as there is a stable internet connection. This allows students everywhere access to the best education possible and tailor it to the students' real needs.

Adaptive learning technologies. This type of technologies help professors / educators / trainers to better focus on every student's learning needs. In every group there some students that are more advanced in the discussed subject than the rest of the group, as well as vice-versa. This technology allows professors to offer students exactly the information they need, at the rate they need or feel comfortable with.

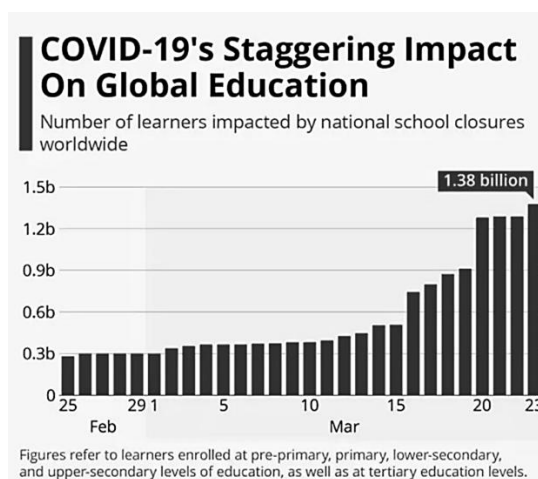
Virtual reality (VR) and augmented reality (AR). Virtual reality technology offers professors and students alike the possibility to experience knowledge in a way not possible up to recent times. This technology, just like the interactive whiteboards, offer students a multi-sensory learning experience, that will ensure better results in terms of comprehension and processing the information. Augmented reality is another useful and innovative technology used in education. Compared with virtual reality which offers a computer-generated reality, the augmented reality uses only few computer-generated elements, placed in a real world, in real time. This technology also helps students to grasp the concepts they study about, faster, easier and in a more pleasant manner.

Artificial intelligence (AI). This technology is present in all the sectors and the education system makes no exception and it is believed that in the near future will be even more present. The benefits of using AI come from two directions: the first one being the accessibility of learning for students and the other offering the professors the most realistic and detailed assessment of their students' performances.

4. Education during pandemic.

The education system had to step into the 21st century with the adoption of technology as a teaching aid but also as a long-term strategy. The classical way of teaching, where professors meet their students and share knowledge, ideas, take part in debates had to intertwine with virtual libraries, online courses, and AI aided testing. Of course, the change has been made gradually in order to try to overcome any possible shocks, but also because of costs. The shift from the traditional education with a pen and paper to the digital one posed numerous problems in terms of infrastructure and consequently in terms of costs. The problem becomes even more delicate if emerging economies come into discussion. However, the biggest problem for the global education system, had sprung in March 2020, when the Covid-19 outbreak put life, as we know it, on hold. It was the debut of an unprecedented crisis in modern times and all the authorities throughout the world had been caught off guard. So the first solution was to stop everything in the attempt to contain the spread of the virus. Schools, universities and any institution involved in education had to shut down their operations. At first, for a limited period of time, then for an unlimited time. The economic crisis that countries were facing could only mean that the national budgets limitations and constraints would impact in a negative way the education system. On the long run this would turn into a human resource crisis even after the covid-19 crisis will have ended¹⁰.

Figure 1. School closure's effects on learners¹¹



All the national governments had to come up with solutions that would ensure access to education but complying with the ongoing restrictions to limit the Covid-19 spread. Naturally, the solution was to transfer all the activities online since technology was already used for teaching. Unfortunately, this solution led to another problem: the inequalities in digital access for a number of countries, as a result of poor allocations of investments in infrastructure and low-income households.

¹⁰ World Bank – “Mission: Recovering education in 2021”

¹¹ Source: UNESCO

Consequently, some of the national authorities, with help from supranational institutions, like the European Union, the World Bank allocated the financial resources needed to update the IT&C infrastructure so that the learning process should be the least affected by the pandemic.

The timeframe for this transition from part offline-part online to full online, was another issue that the national authorities and the heads of al education institutions had to address, because, as mentioned before, the main objective was to reduce as much as possible the timeframe when students did not receive any training.

Universities and all higher education institutions, in general, did have the advantage of being able to transfer their activity online with the least number of challenges, as at this level of education, is far easier to adapt the courses to online teaching, and using all the advantages offered by technology.

The most affected, however, were the institutions that are part of the first educational segments, where the need for physical attendance and real interaction with the professor in a classroom is decisive for the future development of the individuals. Unfortunately, the hybrid system is not the best solution on the long term for these segments, as the children will get even more confused and at best, they can become functional illiterates.

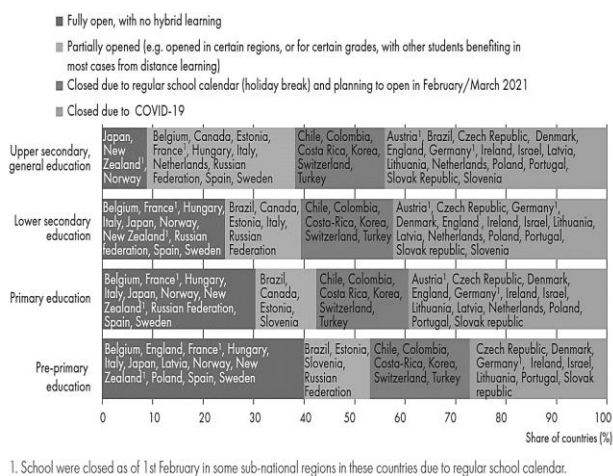


Figure 2. School closure since February 2021¹²

According to different sources the pandemic should end in late 2021, best case scenario, or in 2022, worst case scenario. Of course, the question that everyone’s is asking is what will happen with education after Covid: Will the technology greatly influence the way the younger generations get educated? Will schools and universities return to the old way of doing things just like before Covid? Or maybe a hybrid solution is the best answer for the education needs of the future generations? Whatever the answer might be, or which scenario

¹² Source: OECD/UNESCO-UIS/UNICEF/World Bank Special Survey on Covid.

will be implemented, all the decision factors must examine very thorough what outcome will have each situation.

According to a paper published by McKinsey¹³ & Company, on their website, and based on the latest PISA¹⁴ study¹⁵ there are five key components that must be taken into consideration, in order to maximize the students' learning experience and have the best results:

- The type of device matters;
- Geography matters;
- Who is using the technology matters;
- Intensity matters;
- A school's system performance matters.

The type of device matters. According to the study OECD conducted, some devices have a positive impact on the students' outcomes, some have a negative impact and some have little or no influence at all on their performance in school. The conclusion was clear: for the students where a projector and internet connected computers were used in the classroom, the performance was far better, while the use of laptops and tablets showed had a negative impact on the students' results.

Geography matters. Depending on the geographical region, the use of technology in classes can strongly influence the outcome of the education process. For instance, the students from North America, that used laptops in the classroom, scored far better results than students from any other part of the world. This result, although a pretty alarming one, can be explained by the fact that American students start using laptops as a learning tool earlier than the rest of the survey's respondents .

Who is using the technology matters. The results are highly influenced by the person who is using the technology as a learning tool. The best results were recorded in all regions of the world, when the teacher used the computer as a learning tool, while the worst results were recorded if just the students themselves used computers for learning. This shows that although technology is a very important tool, teachers have a decisive role in the students' education.

Intensity matters. The question in the study had two components: how much time is spent on a computer in the classroom and how much was spent at home, respectively. The results showed quite important differences, meaning that during the classroom the best results were obtained either by the students who spent no time at all using the computer and by those who spent more than 60 minutes in front of the computer. The students with moderate time spent had the lowest results. For the second component of the question, the results were differentiated according to the geographical region: students from Asia, Middle East, non-

¹³ Jake Bryant, Felipe Child, Emma Dorn, Stephen Hall – “New global data reveal education technology's impact on learning”

¹⁴ Programme for International Student Assessment – a worldwide study conducted by the OECD

¹⁵ PISA 2018

EU Europe and North-Africa had better results if they spent no time using computers for homework, students from Latin America and EU who spent a moderate amount of time got better results, but the best performance was obtained by the North-American students who spent more than 60 minutes using a computer for homework.

A school's system performance matters. The schooling system's performance will influence how the students will perform with the help of technology. According to the PISA results, apart from the North-American students who spend more than 60 minutes using the technology for learning purposes, the students from other regions recorded lower scores, the lowest being recorded by students from Middle East and Northern Africa.

Figure 3. Amount of time on devices associated with highest academic results¹⁶



The results of the PISA survey, although not very flattering for the education system from different parts of the world and mainly up to this point in time when it was believed that technology influenced education for the good, must be interpreted correctly and the decision making factors should act accordingly.

As the study revealed, the best results were recorded by the students from United States as they use technology as a learning tool from the early stages of education and the American

¹⁶ Source: Jake Bryant, Felipe Child, Emma Dorn, Stephen Hall – “New global data reveal education technology’s impact on learning”; OECD

education system integrated technology as an effective tool for improving children's learning outcomes.

The lowest results were recorded by the regions where the education system suffers from low allocations of capital from national budgets and where their infrastructure is underdeveloped, so the professors, as well as the students, cannot benefit from technology as well as they could.

Another explanation for the low results is the fact that there is a learning curve for all the implicated factors: students, professors and the system as whole. According to the study, the systems that used the technology as a learning tool, for a longer period of time, got better results, just because the professors and the students, learnt how to use computers, laptops, interactive whiteboards to their advantage and not just occasionally in preparation for some form of evaluation.

5. Conclusion

The tech-aided learning, although it has the benefits of being more accessible both in terms of geography and in terms of costs, (all the students need is a stable internet connection and device that will allow to connect to the virtual classroom) also has its challenges. Schools and universities alike will have lower expenditures, since courses can be provided online, without the logistical nightmare involved by the physical ones.

On the negative side online teaching has not entirely solved all the issues that came up with the advantages, like the evaluation issue as students can be easily distracted by the surrounding environment they access the courses from. The lack of social interaction seen predominantly during the pandemic is another shortcoming of the online education system and unfortunately no matter how advanced the technology will not be able to satisfy the social interactions between people.

After the pandemic the solution for the education system is considered to be a hybrid system (part online, part bricks-and-mortar based)¹⁷, which will mix the benefits from both systems in order to eliminate as many shortcomings as possible at all the levels of the system, whether is the primary education, the secondary one, or higher education institutions.

In this new scenario, the teaching community will have to develop new skills in order to better use this technology, but also to be able to teach the new generations of students digital literacy as it must become a vital component in any curricula.

¹⁷ www.steelcase.com – “How technology is changing education”

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