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The Challenge of Technology in the Classroom, An Uncertain but Necessary Paradigm in a Digital Reality

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Abstract

Until relatively recently, the norm in a school, high school or university class was for the teacher to enter the classroom and begin to give the lesson with a view to a theoretical exam. This is known as teaching or rote learning. The student must retain in memory the knowledge on which he is going to be examined after some time.
But with the massive integration of Digital Technology (DT) today, which is very present in almost all areas of life, this methodology is becoming somewhat outdated (1). This does not mean that it is necessarily obsolete, but that it must be adapted to the circumstances prevailing in today's world. But all change entails risks, and in some cases, these can get out of hand.
We must learn to coexist with technological progress without it having a pitiful impact on the most sensitive fiber of society and on the most economically disadvantaged sectors. A balance must be sought between technology and education so that they do not harm each other.

Keywords: technology, classrooms, students, education, multiverse, digital platform

1. Introduction

The reality is that we are immersed in a VUCA world, a new world. The description of this paradigm refers to the volatile, uncertain, complex and ambiguous. Hence the acronym that describes an updated vision of the increasingly complex and unpredictable business scenario, with technological novelties every day, new production processes and junctures that transform organizations without being able to find a stable and constant point. In this new world, dominated by technology, new trends point to other elements such as the integration of virtual and augmented reality, robotics and Information and Communication Technologies (ICT).
It is a world in which Europe is not doing very well at the moment; almost all the companies that stand out in this sector are in Asia or the United States. Poor talent management, lack of innovation and knowledge transfer between companies and educational centers are some of the reasons why a technological revolution was needed in the classroom.
Education offers us more and more changes. The traditional analog classrooms in which a teacher gives a master class in front of dozens of students seem a thing of the past. The possibilities that technology has offered in the field of education are manifold: digital materials, complementary training, the possibility of receiving lessons online.
The confinement into which the world was plunged since February 2020 to try to contain the contagions that the coronavirus was causing was a trial by fire. Teachers all over the world had to experience overnight that of giving their sessions online, trying to keep the attention of students who were still going to class from their rooms. From this point on, everything changed, more technology in a very short space of time, more adaptation of students to the new teaching systems and an oversaturation of teachers' work in learning the new technologies and adapting their classes to them (27,28,29).
This disruptive situation in which we live also requires us to find new educational resources that make it possible to design effective actions for the learning and well-being of our students. There are general ideas of an emerging pedagogy, which has been growing in education around the world due to its potential and attractiveness: gamification (30,31,34).
As a result of experiences of this type, a sector is taking off in the Spanish technology industry: edtech startups (specialized in educational technologies) have led large financing rounds in 2020 and 2021, as well as unprecedented growth in markets in many countries.
It is time to take the opportunity to 'reinvent education', escape from lectures, give a twist to the contents and enrich the digital units in order to share creations and work with motivating methodologies for the student.

2. Methodology and materials

Technology should be used to reduce the cost and increase the quality of education, not the opposite or to create "artificial barriers". If anything was learned in the

pandemic, it is that distance education, through the use of technological devices, served to respond to an emergency situation. But it could also leave students behind. The dark side of technology in the classroom is the digital divide that many products create because of economic inequalities (schools or families have to pay for tools) and connectivity inequalities (many tools are designed for an ideal environment in which each student and teacher has individual computers and good connections.

But these ideal conditions are not inherent to technology, and there are more and more projects that seek to use technology precisely to close other economic or social inequalities that exist in classrooms.

We could ask ourselves which technology will present a new disruption in the educational field, almost certainly it will not be "the most fascinating", such as virtual reality or the decentralization guaranteed by blockchain. The technology that will bring about the most transformation in education will be the one that allows basic tools to reach all students, low-cost computers, educational platforms for devices with low connectivity, more accessible video calling tools, etc. are the ones that can change the lives of students in the most radical way.

Leading-edge technologies such as Artificial Intelligence (AI) or Metaverse are still finding value in the classroom, while access technologies can bring what is already known to work to billions of students.

AI has managed to revolutionize teaching methodologies favoring personalized student learning. The educational community faces the challenge of training itself to understand how this and other technological tools work, not only to apply them in the classroom, but to transmit that knowledge to students and train them for a future in which technology will be fully integrated into the society of the future. The integration of AI in education has managed to consolidate a teaching model with a multitude of advantages, from the interaction of the student with digital platforms and tools, data is collected to create, for example, intelligent tutorials, which predict the student's future learning, recommend content based on knowledge about that profile or the inclusion of chatbots that would function as a personalized tutor to whom the student could ask any questions at any time (total availability).

AI has proven effective in detecting learning disorders such as dyslexia, where untreated symptoms can lead to poor academic performance and affect the student's self-esteem and emotional development.

AI could help within the educational field in teacher training, allowing them to implement this tool in the classroom, and also to understand how it works and its implication in our lives. There are schools that already offer open educational resources and teacher training in areas ranging from disconnected computational thinking and robotics to programming languages and artificial intelligence.

On the other hand, and for now, the metaverse (three-dimensional, persistent and interconnected spaces that in the future will be accessible to all) that refers to the world of Education is an idea to convene existing and other emerging technologies, so that students, teachers and parents designing a digital avatar (graphic representation of the person to identify as a user in an interactive application), as if we were video game characters. And it will be through the eyes of this avatar that

we will be able to experience an attractive and active digital reality in relation to the teaching-learning process but from a virtual world.
The metaverse will be the evolution of the current Internet, powered by immersive technologies (which use virtual and augmented reality to optimize education). The educational metaverse will be an educational world parallel to the real one, inside which we will be able to interact (classes, teamwork, exhibitions, experiments, evaluations, homework, meetings, debates, conferences, etc.), the actors of the educational process with each other and with the environment (moving objects, moving, etc.) and at the same time, from which we will be able to interact with the real world, and which will exist independently of time and place; it will also be in continuous evolution. New technologies and novelties will be applied and will grow and evolve along with the users.

3. Discussion

One of the problems classrooms face when incorporating technology is that they end up implementing a wide variety of platforms, with different users and interfaces: for math homework go here, for a science quiz there, to read literature novels, there. A whole revolutum of platforms with access to multiple things. Although the integration of technology always contributes to the learning process, such a fragmented experience can mislead the user and make it difficult for teachers to analyze the user's performance in a cross-cutting manner. The perfect solution is a platform that brings together all the solutions under a single user.
As for which technologies will cause a disruption in education in the medium term, it is thought that there is still too much to know about the metaverse to be able to assess its impact with certainty. Currently, the technology that could have the greatest impact on education could be 5G, if it helps us to improve connectivity and thus extend the reach of digital learning solutions that support, and greatly expand, the work being done in classrooms and training.
What seems most obvious is that overuse of technology can be detrimental, but with responsible use, technology can bring much to classrooms (22). We have seen this during the healthcare crisis and in the end the ubiquity and ease that digital tools give us brings us closer together in this interconnected world. Technological deployments in the classroom or in educational centers can help to work along the lines of responsible use of technology and cybersecurity, which can be extremely interesting especially in the early ages of students. What seems very reasonable is to assume that technology is already part of our lives.
For some months now, the metaverse has been making headlines and there is also talk of the potential that these new digital dimensions could have for teaching (23). It is thought that somehow everything seems to point to the fact that the metaverse can indeed reach education, and that it will contribute above all to learning models. What the metaverse does show us is that more and more immersive spaces and experiences are needed, and this is what is being aimed at in many educational centers and even in the University: the fact of converting ideas into immersive experiences thanks to interactive visual communication.

But this must be made compatible with the field of collaboration, which continues to be a global trend given to us by technology itself, and is what our 'product' is going to tend towards in the coming years. We believe that technology is a means and never an end in itself, and in education certainly more than in any other context. Through the flexibility and dynamism of learning spaces and the deep introduction of technology, we seek to improve teaching and transform that methodology of knowing everything by heart and by heart.

The ultimate goal of this idea is to develop the digital competencies of students from an early age. But to carry out this complex idea it is necessary that teachers know, handle and know how to exploit all the possibilities that digital technology offers today (20,21). We must educate those who educate in the use of technology and its adaptation to the classroom in a reasonable way whenever it is needed to improve the learning and teaching of students.

Technology can affect a number of roles of both teacher and student, since ICTs can foster a transition from the traditional role to one in which the teacher plays the role of facilitator of learning in the classroom, and thus a more active role of students, instead of the traditional consideration, already remarked before, of mere receivers of learning (6,7,32). On the other hand, it has a determining influence on the development of important educational tools based on ICTs, although it depends to some extent on other aspects related to the concept, such as the teacher's self-image, gender, age or previous experience (3,8,19).

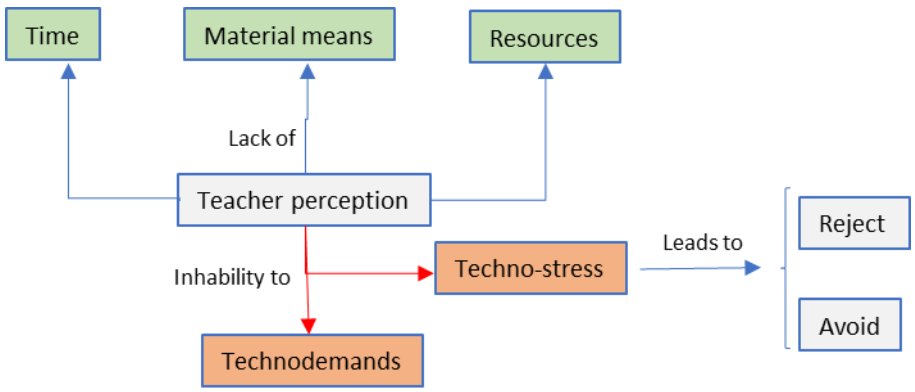

Figure.1 Factors affecting the TiC

This change of direction or role will depend very much on the beliefs or evaluations of teachers, leading to a series of positive or negative attitudes towards ICTs or tencoattitudes (10,12). These vary between the two possible extremes: technophobia or animosity towards the use of ICTs, and technophilia, full affinity or absolute integration in the technological world and the progress they represent. Positive attitudes towards ICTs are the most important ones in the classroom, which are pointed out by many scholars as the real reasons for the success of ICT investments (13,17,26).

But it is also important to identify the causes that lead to the negative use of ICTs in the classroom, with the aim of avoiding them or developing programs or preventive actions to address them (9,24,25). The main cause comes from the mere fact of modifying the traditional role of the teacher, which generates a confusion that implies a resistance to change. On the other hand, there are three other causes that are present and important. The first is the fact that there is no evidence on the real effectiveness of the use of computers in learning, as there is no foundation based on the experience of teachers who have successfully tested them, it is difficult to believe or acquire positive beliefs about their use, and therefore, it does not generate an open attitude towards them, but only causes tension, indifference and/or rejection (33,35). The second is the lack of technical knowledge of hardware and software, which leads to low beliefs in one's own personal capabilities or low technological self-efficacy that hinders and hinders the development of appropriate attitudes, however, encourages animosity or fear of them (4). And finally, the lack of time, means and resources perceived by the teacher, leads to stress and anxiety due to not being able to meet the demands that ICTs require, which leads the teacher to reject and try to avoid them (5,11).
Generation 'Z' feels and defines itself as 'technological' above other considerations such as hardworking, caring or responsible. They accept technology as part of the reality in which they live immersed and do so naturally. They are pragmatic in its use and aware of the risks, but they defend, for the most part, an optimistic and enthusiastic vision of the possibilities it offers, especially in the workplace. In this new world, reality is digital, and we will have to accept it and live with it, incorporating it despite the risks it may entail.

4. Conclusions

Technological development and the inability to adapt at the same speed as it is happening could lead to an aversion to technology and the rejection of its use for fear that it will make us a worse society. However, by now technology has demonstrated its potential to improve different areas of life, including education.
It is important that students begin to familiarize themselves early on with the language and operation of technology through cross-cutting applications in the classroom.

Teaching is a living profession that must adapt to social changes (2,14). Teachers must be trained to move towards digitization and help students to train for their future, in which all their technological tools will be basic in their lives. Teachers should not be afraid of these basic tools but open to their use. It is not a matter of teachers being experts in new technologies, but of using active methodologies in the classroom (15,16).

AI must be able to contextualize information as a human would. For all areas of application, but especially for education, AI is needed, but with 'common sense' that is capable of relating concepts, people, dates, events, etc., to create a predictive

universe that improves learning (18). All this is achieved from a knowledge graph, a structure of data and metadata linked together from their semantic relationships. These technological tools have great potential to improve people's cognitive abilities, but they are just that, tools. Teachers will continue to be the transmitters of knowledge.

There is a need to re-evaluate the tools that during the confinement were chosen, in some cases, hastily. Perhaps some of them were good at the time, because they were agile and intuitive, but they were lacking in terms of privacy, so they should be discarded and new ones should be sought, improved with the same utilities, but protecting our students, especially minors.

Technological innovations applied to education lead us to the big question: Can we continue to build socially valid knowledge, intended to be 'objective' and recognized by a large number of people?

The greatest innovation we must go through is the change of our own look, generating our own experiences that lead us to integrate these innovations as a basis for transformation and enrichment in terms of processes.

Augmented reality leads us to review what we need to augment in order to make the learning experience valuable. Based on the same concept that develops it, we must seek how to augment our reality as educators to capitalize on what these innovations provide as resources.

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