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EDUCATION 4.0 IN A SIMPLE WAY

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Abstract: We are in a time when almost everyone talks about the 4th. Industrial Revolution (4RI), also known as Industry 4.0. The 4RI is transforming productive, economic and commercial relations; These changes are even seen in educational environments, forcing a review of teaching methods and the learning process. These needs and changes that education has to cover is what is known as Education 4.0.

Education 4.0 is a response to the need for technological evolution that the 4RI means, where humans and technology are aligned to allow new possibilities. In the following writing the characteristics of Education 4.0 are mentioned.

Keywords: Industrial Revolution 4.0, Education 4.0, Teaching, Learning.

INTRODUCTION

The buzzword among teachers today is Education 4.0. But what is education 4.0? Do teachers really understand it or are they just following what others are doing? To understand Education 4.0, it is important to understand the Industrial Revolution 4.0.

WHAT IS THE INDUSTRIAL REVOLUTION (IR) 4.0, OR INDUSTRY 4.0?

In the industrial context, this term describes the fact that society has experienced four industrial revolutions in the last 250 years. These revolutions have completely changed, not just the world of industry, but many aspects of the community, the practical nature of the workforce, and the way we live in modern times. Shwab (2016) provides an example that helps to understand how industrial revolutions changed over time, (Figure 1).

1780 - THE FIRST INDUSTRIAL REVOLUTION: THE STEAM ENGINE

The first industrial revolution was devastating because the invention of the steam engine reduced the need for manual labor. Until the steam engine was invented, even something as simple as weaving yarn was only accomplished with a handloom that was operated with a person at your side. Created by Scottish instrument maker and inventor James Watt, the steam engine made it possible to replace these workers with a machine that did the job faster, more accurately, and at lower cost.

1900 - THE SECOND INDUSTRIAL REVOLUTION: THE PRODUCTION LINE.

The second industrial revolution 120 years later was fueled by the invention of the production line. Which replaced the skilled workers that developed right after the first revolution. Similarly, he changed the workforce by giving each worker at each station on the production line a highly specialized task. The workers knew how to perform only one specific operation. It also enabled the production of high-quality products quickly and at a relatively low price.

1970 - THE THIRD INDUSTRIAL REVOLUTION: THE COMPUTER

The third industrial revolution is credited to the invention of the computer. The use of electronics and information technology helped promote automated production. The introduction of the PLC allowed rigid production line systems to be made flexible through a device called a robot. The robot can produce products cheaper and faster than a traditional production line worker, which is why in many cases they have been replaced. At the same time, the flexible production line allows the creation of tailor-made products.

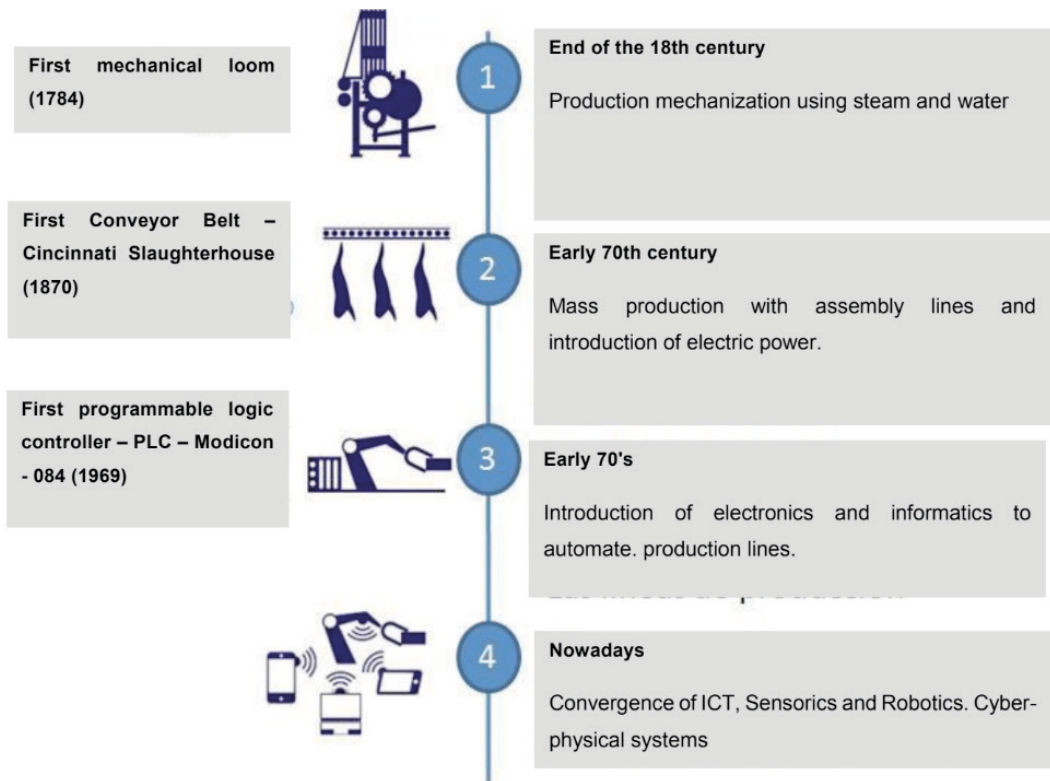


Figure 1. Industrial Revolutions through

Computing quickly entered all aspects of life.

2000 - THE FOURTH INDUSTRIAL REVOLUTION: CONNECTING COMPUTERS

The fourth industrial revolution goes beyond an improvement on the third; in this the advancement of new technologies blurs the lines between the physical and digital worlds. New technologies evolve at an exponential rate and there is no historical precedent that has marked the beginning of the evolution, which is why they are called disruptive technologies. These advances are led by the emergence of artificial intelligence, robotics, the Internet of Things, autonomous vehicles, bio and nanotechnology, 3D printing, materials science, quantum computing, and energy storage (Diwan, 2017).

The 4.0 revolution enables greater effectiveness, speed and flexibility in the production process, giving rise to an increase in competitiveness thanks to three key factors: technology, collaboration and people. This revolution affects not only business, the form of government and people, it also influences education, hence the name of Education 4.0.

EDUCATION 4.0

Education 4.0 is a response to the needs of Revolution 4.0, where humans and technology are aligned to allow new possibilities. Fisk (2017) explains that the new vision of learning encourages students to learn not only the skills and knowledge that are needed, but also to identify the source from which they can learn these skills and knowledge. Learning is built around you in terms of where and how you learn, and your performance is tracked using a custom database. Peers become very significant in their learning as they learn together and from each other, while teachers assume the role of facilitator.

After many discussions, innovations and

general changes in the world of learning, there are 9 trends that stand out related to Education 4.0 (Fisk, 2017).

DIVERSITY OF TIME AND PLACE

Students will have more opportunities to learn at different times and in different places. Online learning tools facilitate remote and self-paced learning opportunities. The classrooms will be changed, which means that the theoretical part is learned outside the classroom, while the practical part will be taught face to face, in an interactive way.

PERSONALIZED LEARNING

Students will learn with study tools that adapt to the abilities of each one of them. This means that above average students will face more difficult tasks and challenges, while those who experience difficulties with a subject will have the opportunity to practice more until they reach the required level. They will be positively reinforced during their learning processes. This can result in positive learning experiences and will decrease the number of students who lose confidence in their academic abilities. In addition, teachers will be able to see who needs help and in what areas.

FREEDOM OF CHOICE

Although all the subjects that are taught point to the same destination, the path that leads to that destination can vary according to the student. Similar to the personalized learning experience, students will be able to modify their learning process with the tools they deem necessary for them. Students will learn with different devices, different programs, and techniques based on their own preferences. Blended learning, flipped classrooms, and BYOD (Bring Your Own Device) form important terminology within this shift.

PROJECT-BASED LEARNING

As careers are adapting to the freelance economy of the future, today's students will adapt to project-based work and learning. This means that they have to learn to apply their skills in shorter terms to a variety of situations. Students must already be familiar with project-based learning as early as high school, as this is when organization, collaboration, and time management skills can be taught as foundational concepts that each student can use in their future careers.

FIELD EXPERIENCE

Because technology can facilitate greater efficiency in certain domains, curricula will lead to skills that only require human knowledge and face-to-face interaction. Therefore, experience in "the field" will be emphasized within the courses. Schools will provide more opportunities for students to gain real-world skills that are representative of their jobs. This means that the curricula will create more space for students to do internships, mentoring projects, and collaborative projects.

DATA INTERPRETATION

Although mathematics is considered one of the three literacies, it is no doubt that the manual part of this literacy will become irrelevant in the near future. Computers will soon take over every statistical analysis, describe and analyze the data, and predict future trends. Therefore, the human interpretation of these data will become a much more important part of future curricula. The application of theoretical knowledge to numbers and the use of human reasoning to infer logic and trends from these data will become a new and fundamental aspect of this literacy.

NEW EVALUATION STRATEGIES

As course platforms will assess students' capabilities at each step, measuring their competencies through questions and answers may become irrelevant or may not be sufficient. Many argue that tests are now designed in such a way that students take them and forget about them the next day. Professors worry that the tests cannot validly measure what students must be able to do when they enter their first job. Since a student's objective knowledge can be measured during their learning process, the application of their knowledge is best tested when they work on projects in the field.

STUDENT EMPOWERMENT

Students will become increasingly involved in the formation of their study plans. Maintaining a contemporary, up-to-date and useful curriculum is only realistic when professionals and young people are involved. Critical student input on the content and durability of their courses is a necessity for a well-rounded program of study.

TUTORIALS

In 20 years, students will incorporate so much independence into their learning process that tutoring will be critical to student success. Teachers will form a central point in the information jungle that our students will be paving the way for. Although the future of education seems remote, the teacher and the educational institution are vital to academic achievement.

These are exciting and potentially far-reaching challenges. For individuals and society, new educational tools and resources hold the promise of empowering people to develop a fuller range of competencies, skills and knowledge, as well as unlocking their creative potential.

THE DIGITAL TRANSFORMATION OF EDUCATION: TRENDS, CHALLENGES AND DEVELOPMENTS PROPOSED BY EDUCATIONAL TECHNOLOGY FOR EDUCATION 4.0

As in industry 4.0, the digital transformation of education is an unstoppable, high-impact and irreversible process. The question for schools is not whether or not they will ride the unstoppable wave of digital transformation -since those that do not will disappear- but the speed at which they will carry out this process. In this sense, technology is a key catalyst in the process of digital transformation of education.

The NMC Horizon Report for Higher Education outlines some trends, challenges, and developments in educational technology that will be key in the digital transformation of learning and education 4.0.

Trends accelerating the adoption of new technologies in education:

- In 5 or more years:
 - Advancement of the culture of change and innovation
 - Rethink the functioning of the institutions
- 3 to 5 years:
 - Redesign of learning spaces
 - Shift to deeper learning approaches
- In the next 1 or 2 years:
 - Growth of focus on measurement of learning
 - Increase in blended or hybrid learning

Significant **challenges** for digital transformation:

- Solvable:
 - Mix of formal and informal learning
 - Improvement of digital literacy

- Difficulties:
 - Models of education in competencies
 - Personalization of learning
 - Very difficult:
 - Balancing our connected and unconnected lives
 - Maintain the importance of education

Important **developments** in educational technology for education 4.0:

- Within 1 year or less:
 - Bring your own device (BYOD, bring your own device)
 - Learning analytics and adaptive learning
- Within 2 to 3 years:
 - Augmented and virtual reality
 - Creation spaces
- Within 4 to 5 years:
 - Affective computing
 - Robotics

Among all these developments, challenges and trends, the one with the greatest impact in the short and medium term will undoubtedly be the use of data analytics in digital solutions for learning. All these learning services are developing algorithms that intelligently, dynamically and in real time check the progressive learning of students on a specific subject, recommending the most optimal route or path as well as the most appropriate learning modalities for its successful acquisition by part of the student

CHALLENGES OF EDUCATION 4.0

A priori, it could be thought that technology or the digital transformation of

education is the most important challenge for education 4.0. However, as in the case of the 4.0 revolution, the technological challenge is the easiest. The most complex challenges of education 4.0 have to do with the people who have to manage this change and are the following:

- The change in social practices and the culture of schools, universities and public administrations.
- The training of teachers and managers.
- The encouragement, attraction and development of the talent of teachers who have to make this 4.0 education possible from their training schools.

CONCLUSIONS

In the era in which we find ourselves, where students own smartphones and use them in the classroom, robotics is used for many things, including home help and exams

can be taken online, more after the COVID pandemic. -19; it is not difficult to imagine what Education 4.0 holds. Considered the future of education, preparing us to change the consumption of information dramatically, Education 4.0 completes in a way the phenomenon of digital penetration in our daily lives. Education has now been seen more as a lifelong process rather than a classroom-oriented ritual or, for that matter, just a simple step into the professional world. Students and teachers will now seek to redefine the ways in which learning has impacted their lives. Unlike the interactions that take place in an immediate physical and social context or in a real space, communication and relationships in Education 4.0 require interactions in a virtual environment or cyberspace. It is at this moment that the fundamental difference between learning to use ICTs and using them as tools for learning must be highlighted.

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