

Digital Revolution of Education 4.0



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Abstract: The purpose of this article is to show the evolution and requirement of the educational system such as the Industrial Revolution 4.0 (IR 4.0). The fourth industrial revolution (RI 4.0) brought about a state of change in education. IR 4.0 is disciplined by artificial intelligence and digital physical frames, making the human-machine interaction even extra versatile. By preparing students for the next life and working with IR 4.0, you can replace people working in specific fields with smarter robots. Education requires the use of relevant information and skills that cannot be replaced by robots. Creative Education 4.0 ends innovation by focusing on improving education and skills to make future learning more personal, super, smart, portable, global and virtual. The explosion of IR 4.0 has changed future learning into fairy tale miles. Science fiction goes to science-creative energy is omnibus; virtual classrooms and augmented reality grow in smart classrooms. Self-sufficient smart robots, guided tours, vehicles and classrooms are today's pleasures. State-of-the-art instructors need to look for new ways to improve their future learning using educational innovations. In this sense, this introduction assumes that teachers need to review the old origins of orientation and learning and update their learning experience to complete the necessities of Education 4.0.

Keywords: Industrial Revolution 4.0, Knowledge Management, Learning Methods, Online Learning Tools & Higher Education.

I. INTRODUCTION

Beyond 21st century capabilities, abilities, advanced development, like Artificial Intelligence (AI), extensive information and research, distributed and portable computing systems, online networks, the Internet of Things (IoT), Virtual Reality (VR), Reality Augmented Computer Entertainment (AR) is transforming the educational process and progress into new computer-based learning methods, more generally smart-class products. The arrival of the Z generation with advanced information and digital capabilities has raised many challenges for teachers. The current meaning of the Gen-Z consists of a dialect that is misunderstood by a more mature generation; you have your own type - a kind of computer. They have their own understanding and expression. Advanced locations use the powerful tools of the Internet and computer innovation to create imaginative, creative and expressive elements of digital security. These technology prisoners and the Wi-Fi generation also tend to engage in intelligent learning through frames through complex image editing, symbols, sounds, videos, entertainment, transfer and information artificial (AI). To stay alive in this adult age, computer training and blended learning methods are needed to improve learning and skills by exchanging classrooms, MOOCs and discussion forums.

Revised Manuscript Received on December 30, 2019.

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Industry 4.0, like all data enhancements, exists in its own model for each category or permutation. More or less, on one side, so-called smart frames can reproduce simple and tired calendars such as digital series production. In this case, the Industry 4.0 digital physics framework can be viewed as a true or similar type of generation for reproducing social behaviour and repeating plans. The digital physical framework can then rebuild adaptability, creativity and a new absolute H2M connection, with an extremely intelligent and creative commitment and a common effort in the fluid system.

II. EMERGENCE OF THE INDUSTRIAL REVOLUTION 4.0

Industry 1.0: (1784): Built on machinery for water and steam production.

Industry 2.0: (1870): Built on mass production possible by dividing labour and using electricity.

Industry 3.0 (1969): Built on electronic usage and information technology to make more automated.

Industry 4.0 (Today): Using a cyber-physical system.

The fact, speed and impact of the present findings claimed that the Fourth Industrial Revolution was valid. Innovation and technology development are widespread in such fields as artificial intelligence, robotics, the Internet of Things, autonomous vehicles, biotechnology and nanotechnology, 3D printing, materials science, cloud computing, and energy storage. These discoveries were so fast that the fourth industrial revolution had formed, which almost confused almost every sector.

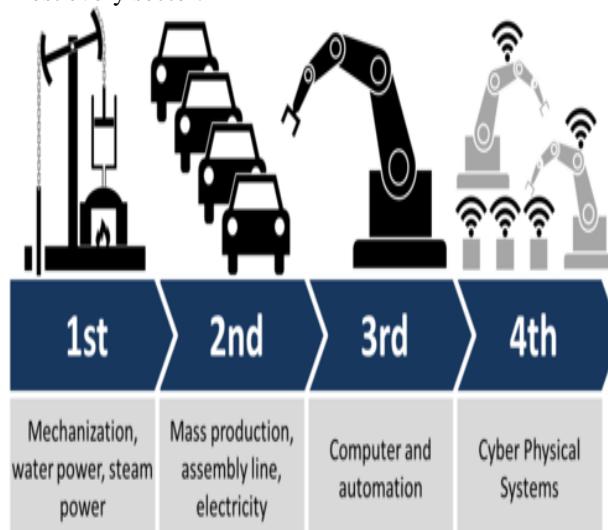


Figure 1: Emergence of the Industrial Revolution 4.0



III. BACKGROUND OF STUDY

Market enlargement, internationalization and emergent competitiveness have led to the emergence of the so-called Fourth Industrial Revolution and the parallel development of the Industry 4.0 concept and its field of research. Industry 4.0 follows three previous technological transformations: steam power, which was the transforming power of the 19th century; electricity that transformed for most of the twentieth century and the era of the computer era of the 70's. The so-called Fourth Industrial Revolution is based on the development of fully automated and intelligent manufacturing capable of communicating autonomously with major corporate players. Industry 4.0 is based on horizontal and vertical integration of production systems driven by real-time data exchange and flexible production to enable custom production [2, 3]. The fourth industrial revolution will lead to complete processes of automation and digitalisation and the use of electronics and information technology (IT) in manufacturing and services in the private environment [4].

The **McKinsey Global Institute** defines the Fourth Industrial Revolution as the era of cyber-physical systems - systems that integrate computational, network and physical processes and encompass countless technologies encompassing mobile devices, the Internet of Things (IoT), artificial intelligence (AI), robotics, cyber security and 3D printing [5]. So, "the impact of the development of technologies such as 3D printing, online sales services such as automotive services, home medical examinations, ordering food directly from the store to the refrigerator and the like will have a significant impact on changes in medium-sized enterprises (SMEs)." [4].

According to Schwab's visionary work [6], the Fourth Industrial Revolution is developing at an exponential, not linear, pace that not only changes "what" and "how" to do things, but also "who" we are. The introduction of Industry 4.0 has brought and will continue to bring profound changes in the global economy to variables such as investment, consumption, growth, employment, trade and so on. Growth and employment are certainly the areas most affected by the introduction of Industry 4.0 innovation.

Interestingly, **Roman et al.** [7], analysing the German context, proposed projected expected growth at various levels through the application of industry-related innovation 4.0. According to the authors, there will be improvements and significant improvements in productivity (manufacturing sectors from € 90 billion to € 150 billion), revenue growth (from about € 30 billion a year), employment (6 percent increase over the next ten years) and investment (about € 250 billion over the next ten years). The term "Industry 4.0" was introduced in Germany and was first used in 2011 to identify a new proposal for Germany's economic policy; it is based on high-tech strategies [8]. This is not surprising, as the highest levels of Industry 4.0 deployment can be observed in Germany and especially in multinational technology corporations. Companies like Siemens, General Electric and Mitsubishi already have a broad portfolio of manufacturing and automation solutions. "Manufacturers and developers of automation technologies such as DMG Mori, Wittenstein, Bosch, Rockwell, Omron,

Schneider, Stubb, Haskawa, Kronz, PSI and Software AG already sell many technologies and solutions such as Industry 4.0" [9]. Since 2011, the term has been widely used not only in Germany and in the field of engineering, where it was first introduced, but also in economics and management. In fact, it is fundamentally changing the way companies are structured and managed. Although some reports have been published, mainly in the administrative literature, the academic discussion on Industry 4.0, its content analysis and a detailed description, as well as an explanation of possible future developments, deserve careful attention [10]. While this document will illustrate the definitions created by different authors, at this stage it seems appropriate to recall only two in order to create a common understanding of the domain that underlies this research. **Pan et al.** [10], for example, states that "Industry 4.0 enables industrial components to communicate with each other", while **Kovacs et al.** [11] affirms that "the essence of the Industry 4.0 concept is the introduction of network-related smart systems that deliver self-regulated production: people, machines, equipment and products will communicate with each other." To date, several reports have been published, mainly in the management literature, which discuss major changes in business management models and major components of firms. The academic discussion of Industry 4.0, its content analysis and detailed description, as well as an explanation of possible future developments, deserve further attention [12]. Therefore, the topic of Industry 4.0 has not yet been sufficiently studied, although research in this area has been developing rapidly [13 - 15], notably over the last three years.

Two literary reviews have been published in this field [16, 17], but none are focused on management aspects or only on the development of managerial topics, so this topic remains unreliable.

IV. OBJECTIVES

- What are the requirements of an education system such as the Industrial Revolution 4.0 (IR 4.0)?
- What are the benefits of the Industrial Revolution 4.0 for students, teachers and administration?
- How to meet the challenges of transforming Industry 4.0?

The paper begins with a description of the overview, requirements, and benefits of the Industrial Revolution for students, teachers, leaders, and administration. The impact of the Industrial Revolution 4.0 on higher education will then be outlined and the results will follow along with experiments and discussions. The paper concludes with the conclusion and future scope of the study.



V. OVERVIEW OF INDUSTRIAL REVOLUTION 4.0 (IR 4.0)

The fourth industrial revolution (the fourth IR) is the phase of knowledge expansion where the boundaries among physical, digital and biological fields are unclear, Schwab (2016) [6].

Every IR changes lives, jobs and relationships thanks to change and digitization. As this environment continues to change, managers and employees must adapt quickly. We need to understand that risks and changes are inevitable because we need to be prepared and ready for a new approach. Without sufficient knowledge and endurance, organizations cannot compete with the ever-changing environment. Managers should guide the organization so employees can change their views, ideas and attitudes over time. Organizations should think of knowledge management as an approach. This means that it is necessary to know exactly how to spread Knowledge Management (KM) concept to improve system execution and processes. The rapid change of knowledge has created a new educational model for the future. The fourth IR is made difficult by the speed, convergence of different technologies, widths and depths and scale regression.

A. Education 4.0

In general, Education 4.0 is an institute of believed that promotes intelligent and smart thinking in education. Education 4.0 promotes education differently, mainly by consuming technology-based tools and resources. This means that students will not learn to use textbooks, pens, and essay teachers in traditional classrooms. Instead, Education 4.0 allows remote students to access the Internet and enroll in courses through a variety of open online courses, video chats, or voice calls to learn more dynamic material about the same students. You may not learn as much as you do.

Education 4.0 was recognized as a respond to Industry 4.0, greatly increasing the use of Internet technologies and cross-communication tools. Many other industries are responding to this change in business practices and creating Healthcare 4.0, Technology 4.0, and more. The same is true for the education ecosystem. Education 4.0 is developed for Industry 4.0 and prepares qualified and qualified professionals to prepare for a very global and digital work environment.

B. Requirement of Education 4.0 in Industry

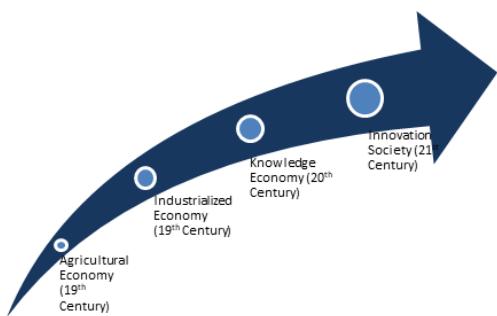


Figure 2: Rapid Evolution of Industry 4.0 requires Education 4.0

One of 4IR's requirements is the development of human capital to fulfil the needs of knowledge and expertise. As we saw in the earlier sector, we need a production and knowledge exchange program. To change your reading and learning habits, you need to develop new smart teaching skills. Thanks to the rapid development of Industry 4.0, Education 4.0 should move from the current 2.0 education to 3.0 / 4.0.

Education 1.0: Centuries of memorization practise

Education 2.0: Learning through Internet

Education 3.0: Consumption of knowledge and labour

Education 4.0: Enables education to create change

The growth of modern research shows that education should keep pace with the student world and provide them with a secure and sustainable future. Education 4.0 uses a unique technology and tools Education 4.0 to create a similar environment for both, ensuring that the educational experience is similar to the work experience. Therefore, Education 4.0 is a more realistic and practical learning method, which can produce excellent results for student learning. Maintaining a changing world is important and Education 4.0 is the method used by educational institutions to ensure this. Research has shown that student learning outcomes can improve as education becomes more personal. In Education 4.0, this customized study is possible. In fact, Education 4.0 uses intelligent school management systems, learning management software, communication tools, and other teaching and learning tools. Personalized learning with Education 4.0 promotes understanding and allows students to reach really interested, more professional and memorable materials. It also means that students can become interested professionals. General education 4.0 allows students to achieve better learning outcomes based on real scientific or professional interests.

C. Benefits of Education 4.0 for Teachers

Education 4.0 is a smart, virtual and digital revolution for the benefit of many stakeholders, including teachers and educators. Teachers may think that the Education 4.0 personalized learning philosophy will give more work, but it is not. In contrast, Education 4.0 is beneficial for school teachers and educators in educational institutions for the reason that they can better meet the specific needs of students.

Through Education 4.0, teachers can ultimately teach students, not classes. Use tools and techniques that promote this personalized learning goal. This leads to better learning outcomes for students and better educational outcomes depending on what results educators and teachers bring.

Education 4.0 permits teachers and educators by providing best methods & techniques to facilitate work. School management systems like Fedena allow teachers to communicate better with students, but do it more effectively and quickly. Reduce the administrative burden by automating many processes while modernizing specific processes and teaching methods. Education 4.0 aims to improve performance by enhancing teacher skills and improving student learning outcomes.



D. Benefits of Education 4.0 for Managers and Administrators

Education 4.0 does not apply only to teachers, trainers and students, even administrators and non-educators, such as administrators, can get the benefits from Education 4.0. This is largely due to the fact that Education 4.0 is based on the optimum use of technological tools and resources. These tools, such as school management systems, are frequently developed to increase the efficiency of educational institutions and overcome the financial liability of work and management.

In Training 4.0, these staff can escape the burden of boring and error-prone processes, but they can focus on what's best. This has had a positive impact on students' learning outcomes. Administrators can focus on satisfying their needs rather than on system distortions caused by day-to-day office management and distractions caused by fire. From a management point of view, Education 4.0 creates the system well-organized and clearly produces superior financial results. By reducing inefficient management costs, it is still possible to obtain the savings that all schools still need. Second, management can move to a more efficient workplace and implement a more effective business model in Education 4.0.

D. Benefits of Education 4.0 for students

This is the most important goal of Education 4.0 for all educational institutions: to encourage students and improve students' learning outcomes. Students are the main stakeholders of the educational ecosystem and are the main beneficiaries of the educational ecosystem.

Education 4.0 treats students as beneficiaries as before. Using technology, students can connect in a better way with many other stakeholders in the system, better communication with teachers, parents and management. Student learning outcomes are directly proportional to the level of implementation of Education 4.0.

Education 4.0 also helps improve learning as most of the tools and methods that support Education 4.0 will help you learn more effectively and effectively than traditional teaching methods. In many cases, learning is personalized, so students are interested in Education 4.0. In other words, there is a natural interest in the curriculum.[19]

Education 4.0 also styles learning more dynamic exercises more accessible such as photos and videos that make students more interested and learn through tools and platforms, even when students can connect and learn at any time. Easy access to teaching materials 4.0 Education is truly revolutionary and greatly improves student learning outcomes.

E. Influence of Industrial Revolution 4.0 on Higher Education

Higher education in the Fourth Industrial Revolution (HE 4.0) is an open, rational and dynamic door that can change the thinking of society and upgrade the living standard of the people. The fourth industrial revolution was triggered by counterfeiting and altered the working environment in the central workplace. The combination of human and machine reduces the separation between humanistic and sociological disciplines and between science and innovation. For

example, Ipoh has a restaurant that serves customers who use "famous robots" instead of waiters / waiters. It shows that automation of services reduces the use of human services. In addition to technology, there is inequality because technology and connectivity are not the same. Many people are unemployed and have a global population of 7 billion, but only 3.5 billion are available.[19]

Peter Drucker said in 1997 that the university would not survive and higher education is in serious danger. The university campus as an institution will not survive. The current dormitory is completely inappropriate and completely redundant. This is really a prognosis because Paris's innovative university coding was started in 2013 and is open 24 hours a day. There are no teachers, books, or education. Students work on assignments and receive different learning programs at specific levels. When the project is complete, earn points and move on to the next level.

There are many changes to future teaching methods. Educational content, the role of educators and students. We need to reverse the logic of the education system to make it more appropriate & personalize for students.

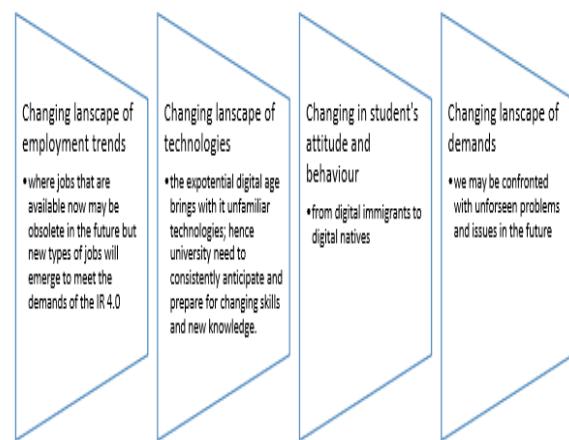


Figure 3: Influence of IR 4.0 on Education

V. EXPERIMENTS OF INDUSTRIAL REVOLUTION 4.0 IN EDUCATION

In 2017, **Dr. Colin** was very concerned about his trainer. They react to the relationship with the fourth investor and ask whether the university can manage convergence, liquidity, energy transfer, and the extraordinary ethical issues raised by the fourth portfolio. As part of an important strategy to survive, we will build digital resilience and digital governance and accountability organizational capabilities, emphasizing new technologies and investments in people-to-people relationships. However, it is not clear whether the higher education sector is suitable for "creating" students, scientists and professionals. Encourage the environment, remove obstacles, visualize, revolutionize, generate and co-operate. Development of the 4.0 ecosystem adapted to the institutional environment.



Promote communication between students and staff and closer interpersonal relationships through global and regional networks and associations of higher education institutions [20]. Transfer of programs and technology that integrates the sense of intellectual value and ethics, national identity and community relations. Pay attention to the benefits and risks of the Fourth Industrial Revolution (Wahid Omar, 2017).

Not only do start up workers need digital skills, but more and more factory workers, executives, and banking executives need to be familiar with the digital realm. Our education system, especially the way we learn and teach is essential.

Digital education allows people to continue to participate in social life in an independent manner. In addition, digital education helps companies stay competitive. Digital conversion requires a fundamental change in the learning method. This is because digital skills have become the fourth most important ability in literacy and arithmetic.

VI. DISCUSSIONS & DEVELOPMENTS

From elementary school to entrepreneurs, there is a big trend in the many discussions, innovations, and general changes in the virtual world.

A. Different times and places

Students will get the more prospects to study virtually in numerous places. Online learning tools offer opportunities for distance learning and the pace of each. The class is twisted creatively. In other words, the students can learn theoretical part outside the classroom and the actual part can be learned face-to-face and interactively manner.

B. Personalized knowledge

Students learn educational tools tailored to their skills that, once they reach a confident level, students will have to cope with more difficult tasks and problems. Students facing difficult subjects have the opportunity to practice above the desired level. Students are actively encouraged in personal learning. Provides positive training and reduces the number of students who lose confidence in their academic abilities. In addition, teachers can clearly see which students need help.

C. Unrestricted options

Each topic taught leads to the same destination, but the route to that destination may vary. As with a personalized learning experience, students can turn their learning process into a tool they consider necessary. Students learn a variety of tools, techniques, and techniques based on their tastes. Mixed learning, price fluctuations and BYOD are key terms in this change.

D. Based on the project

Students adapt to project-based learning and work when their careers coincide with the future of the free economy. This means that you have to learn how to apply the technology in different short-term situations. Students should be familiar with the training in high school projects. These are the building blocks of organizational skills, collaboration, and time management that all students can study.

E. Familiarity in the field

Because technology can improve efficiency in some areas, this process provides the skills that only human knowledge and face-to-face contact need. That is why this course emphasizes on-the-spot experience. The school offers students the opportunity to acquire practical skills that represent their work. In short, this course will create more space for students to undertake internships, mentoring projects and collaborative projects (such as projects).

F. Data analysis

Mathematics is considered one of three types of literature, but in the near future, the passive components of this culture will not be relevant. The computer quickly processes each statistical test, describes and analyses the data, and predicts future trends. As a result, human interpretations of this data will become more important parts of future programs. Applying theoretical knowledge to numbers and using human reasoning to capture the logic and trends of these data is a key aspect of this ability.

F. New Pattern for exams

While the course platform assesses students' abilities at each stage, it may be too much or not enough to measure skills based on questions and answers. Many people believe that exams are designed to help complete student materials and forget about exams the next day. Educators fear that exams may not effectively measure the skills students should acquire when they get their first job. The actual knowledge of the students can be measured in the learning process, which improves the testing of knowledge applications when working on field projects.

G. Comprehensive approach

Students increasingly participate in training courses. It is practical to maintain updated and convenient courses with the participation of experts and "young people". A complete learning program requires a critical opinion of the student on the course material and sustainability.

H. Orientation is becoming more important

For 20 years, students will incorporate this freedom into their learning and orientation process as the basis for their success.

Table 1: Results of Industrial Revolution 4.0 in Education

Parameters	Achieved results	Remark
Achieved Benefits of Education 4.0 for Teachers	Revolution of Education 4.0 offers new education system and transform innovative learning thereby causes improvement in teaching	Utami et. al. (2019)

Benefits of Education 4.0 for Managers and Administrators	One of the most important challenges of implanting Education 4.0 is lack of knowledge among managers and administrators	Hariharasudan and Kot (2018)
Benefits of Education 4.0 for students	Students will learn new digital skills which will enhance their career growth	Hussin (2018)
Influence of Industrial Revolution 4.0 on Higher Education	It will bring smart machine integrated with internet of things	Baygin et. al. (2016)

VII. CONCLUSION

Digitization and virtualization in education are motivating, inspiring and potentially broad challenges for individuals and societies. Smart and intelligent educational tools and resources should allow individuals to develop more complete expertise, knowledge and skills and unleash their innovative prospective.

In fact, many of the ongoing changes are reminiscent of the exciting words of Irish poet William Butler Yates "Education is not to fill the bucket, but to ignite it."

Organizations must have an effective approach to address the challenges of Industry transformation. The development of technologies such as Big Data Analysis and Artificial Intelligence is replacing maximum processes. Instead, as the subsequent generation uses smartphones and applications, new technology transforms our lives "by inventing new things that are unthinkable and creating new ways that are unimaginable."

As we master the Fourth Industrial Revolution, we must preserve our core attributes, our ethical standards, and our way of life. The revolution of higher education is a key factor in the digital transformation of IR 4.0. Higher education pioneers must ensure that their foundations are computerized, open the doors created by IR 4.0, and have a high level of commitment and agility. If we misuse the progress of the fourth round of IR, it will unquestionably lead us away from our lifestyle, the quality of the centre and the happy nature of the schools, universities and colleges. In this way, higher education should develop codes of ethics and responsibility to monitor the progress of fourth investor relations by organizations and staff.

To be successful in the workplace of the future, people must have appropriate digital and virtual education. At school, university, or at work - the ever-changing digital landscape is making IT skills increasingly important and effective.

Digital media has created new opportunities for digital learning for everyone. I believe that we will be able to manage with the experiments of digitization and take

advantage of the opportunities it offers, but we need a comprehensive approach.

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