

# Challenges of the Industrial Revolution 4.0 in the Field of Learning towards Education 4.0 by Utilizing Information Technology

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**Abstract:-** The world today is changing so rapidly. If in the past the community was an agrarian society that relied on agriculture with simple tools, now it has developed into an industrial society, with the advancement of information technology and innovation called the Industrial Revolution 4.0 era. Everyone in this day and age must be equipped with the knowledge and skills necessary to face every challenge that comes their way. To find intelligent, creative, and inventive people, educators must redefine new teaching approaches. Teachers have an uphill battle in ensuring that their students achieve learning outcomes that are in line with the goals of revolution 4.0. By using the library method, this research uses qualitative techniques that rely on expert views which are articulated in the form of texts found in books, journals, and other publications as sources of data or references.

Today's world is evolving at such a quick pace. As a result of the Industrial Revolution 4.0, the community has transitioned from an agricultural civilization reliant on agriculture and rudimentary tools to an industrial society reliant on information technology and creativity. Every person in this day and age must be equipped with the knowledge and skills necessary to meet any challenge that comes their way. To find bright, creative, and inventive people, educators must redefine new teaching approaches. Teachers have an uphill battle in ensuring that their pupils are achieving learning outcomes that are aligned with the 4.0 revolution's objectives. This research employs a qualitative approach to the literature method, with the author relying on texts from expert viewpoints expressed in books, journals,

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## I. INTRODUCTION

The current economic condition is undergoing a tremendous shift. Since the industrial revolution, different information and communication technologies have played a major role in people's daily lives and as a consequence have produced a digital society (Nursyifa, 2019). People's lifestyles are changing drastically as a result of the accelerating speed of cyberspace. Since becoming a digital society, it has created changes in people's lifestyles regardless of distance, time and place. It connects everyone

globally with a broader vision and keeps updating faster. People have to live together in the new social media environment, and it is very important to be aware and know about social media. In addition, jobs and organizational structures will also change. Life will be more attached to the machine with more advances in its functions and programs. All involved will have a high life expectancy (Savitri, 2019).

Changes in the social economy have been developing steadily. Formally, it is the era of the Economic Revolution 1.0, to the digital social economy, the era of the Economic Revolution 4.0 (Hamdan, 2018), which plays an important role in changing lifestyles. The Economic Revolution 1.0 is slowly changing. Previously, an agrarian society was complete, with few machines, such as a loom, and a simple basic steam engine. In this era, work is divided among workers on the basis of fitness and physical ability. The Economic Revolution 2.0 is changing faster with the industrial revolution. Using energy sources such as oil, electricity and solar steam engines. It has developed improvements in the work process. And it is commonly known as the Industrial era (Ahyani & Slamet, 2021). Economic Revolution 3.0 has become a rapidly changing economy. By using information technology, better work performance. It has a fast communication and information exchange network. This is the era of the world without borders, that is, creating special skills in producing various products. This period is commonly known as the era of globalization (Ahyani & Slamet, 2021).

The Economic Revolution 4.0 has brought us to an era of unprecedented change. The acceleration of change increased phenomenally in this period. This is a virtual world that is connected to the virtual world, one with the real world. This is an era of innovative knowledge creation, but over time, it becomes obsolete and new knowledge emerges. This is an era of innovation integrated with knowledge. Different socio-economic conditions in each era demand unique and skilled human resources respectively. The responsibility for developing the required skill sets lies with the individual in learning management, to develop knowledge, skills and abilities related to the material according to the needs of the community (Risdiyanto, 2019).

The industrial revolution 4.0 is currently running smoothly as a result of global technological advances. The digital economy, intelligence and big data are all part of the industrial revolution 4.0. "Internet of Things (IoT)" is a

network of devices, sensors, and people that can all interact with each other via the internet (Maria et al, 2018). The field of education is being affected by the Fourth Industrial Revolution (also known as IR4.0). Increasing teacher competence requires the use of digital technology in the learning process. This cannot be done in a vacuum (Ghufron, 2018). Teachers face a variety of problems that require them to be flexible and open to change. No one, not even a sophisticated machine, can take the position of a teacher. Students still need teachers to help them develop character, tolerance and moral principles. Teachers can also help children develop empathy and unleash their creativity by cultivating empathy in them. There are many people involved in human education, including educators, students, and parents (Retnaningsih, 2019). Netizens called him a modern student among other students. While this is happening, educators are currently at work. Do not use for parents who are referred to as current parents or for parents. The way we learn has changed as a result of advances in information and communication technology. The use of ICT has resulted in five transformations in the learning process: (1) from training to performance; (2) study anywhere and anytime; (3) paper for online learning; (4) physical facilities to network facilities; and (5) cycle time learning to real time learning (Utomo, 2019).

## II. METHOD

This study uses descriptive analysis by utilizing data obtained from literature studies as the primary data source. Using qualitative methods, researchers examine and understand the significance for certain individuals or groups of people as a result of social and humanitarian problems (Creswell, 2015). The final qualitative study report has a flexible framework. As a result of an inductive form of research, this research focuses on the significance of each person and translates the complexity of the situation. Instead of starting with theory, qualitative research begins with field observations. Because it prioritizes the processes that occur in the field, the data and information collected from the site are used to obtain meanings and concepts, which are then presented analytically and descriptively (Sugiyono, 2010).

In general, this kind of research contains data about the main phenomenon of the study, the research participants, and the geographical location of the study. An important finding of qualitative research is that it can reveal the study strategies used. With regard to the educational process, qualitative research is concerned with finding out how well it works and where it can be improved by looking at what is actually happening in the field as a study. Also look at phenomena such as educational facts and events to formulate hypotheses about educational concepts and principles based on what actually happened.

## III. RESULTS AND DISCUSSION

Responding to Revolution 4.0 in the field of education, learning management focuses on preparing students to be more creative and inventive. As a result, the younger generation needs life skills and the ability to innovate. In addition to having 21st century skills such as leadership, collaboration, creativity, digital literacy, effective communication, emotional intelligence, and problem solving and teamwork, students must have life or inventive skills to thrive in the Revolution 4.0 education era. This implies critical thinking skills, creativity, and innovation, as well as cross-cultural understanding, information literacy, and media literacy, as well as occupational and educational skills (Muhali, 2018).

The agrarian society's response to education is called Education 1.0, the industrial community's response is called Education 2.0, globalization is called Education 3.0 and innovation is called Education 4.0 with the Leapfrog principle (Harkins, 2008). Education 1.0 is aimed at those living in rural areas. Teaching and learning occur when ideas and in-depth study are used to convey knowledge. Students are attracted to professors who emphasize explanation as their main teaching strategy (Surani, 2019). Education 2.0 provides a less innovative approach to teaching and learning in response to industry demands. The focus of learning management is on the application of learning technology in the workplace. For Pooworawan, education is like mass production in this day and age. Whoever passes will have the same credentials as the others. The school building resembles an industrial factory; students are goods; curriculum is item specification; tests are quality assurance measures; a certificate or degree serves as a guarantee document; and educational institutions resemble product brands (Oktavian & Aldya, 2020).

As we move towards a "technological society", education must comply with these requirements. It generates new information by encouraging self-study. Teaching materials, digital media, and social media are all forms of learning technology used in modern education. It emphasizes hands-on and collaborative learning. This learning management system, according to Harkins (2008), allows students to create their own information rather than just consuming it.

The 'innovation era' demands an educational revolution 4.0, which fulfills these demands. Parallelism, connection, and visualization all have an effect on behavior, and these correlate with the change. This learning management system should assist students in developing the capacity to use new technologies, which will enable them to progress in line with social change. The learning management system of this era helps children grow with lifelong knowledge and skills, not just the ability to read and write, as stated by Rukajat (2018). Able to integrate into society and have the highest level of competence. As a result, Revolution 4.0 in education will cover a wider range of issues.

As a result, to meet the needs of human resources, learning management must adapt to changing social and economic conditions. If we want good, smart learners who can live in happy societies, we need a change in learning management that goes beyond teaching the 3Rs: reading, writing, and arithmetic. Instead, we need learners who have the qualities and skills of responsiveness. support for the upcoming educational revolution known as Revolution 4.0 (Lase, 2019).

Skills to innovate – the process of looking for possibilities in innovative design, selecting the best way to produce, and leading the most feasible way that helps to benefit from innovation. Where each process requires different skills such as critical thinking, design and selective thinking, productive thinking and problem solving, entrepreneurial thinking, responsible thinking, social awareness thinking, scenario thinking. The skills that come from integrating life skills and innovative skills together become the main characteristics, to develop individuals to use Intelligent agents, Mobile technologies, Cloud computing and services, which Savitri (2019) explains that they are the main attributes of cloud-based computing services. , measurable, elastic, divided, To develop youth to use new technology applications to use intelligent agents, Mobile technology, Cloud Computing and services, it is very important to look for new approaches and ways in learning management; In addition to learning management for 21st Century Skills. Many concepts of learning management for 21st Century Skills are still very interesting or can be used (.

Zhao's (2012) concept is to organize the learning process like being in a real situation working in a factory. According to Zhao (2012), there are 4 ways: 1) Critical-Based Learning, 2) Creativity-Based Learning, 3) Productivity-Based Learning, and 4) Responsibility-Based Learning. Prepared to adapt Constructionist Learning, namely 3R, 3I and 3P. 3R is Regulating understanding, which consists of Recalling, Relating, Refining; 3I is Investigation, which consists of Inquiring, Interacting, Interpreting; and 3P is Producing, creating works by Participating, Processing, Presenting. Subir (2020) proposes that Social & Virtual Learning should be Learning with social media, in large groups and in a virtual environment, suggesting the process as: Massive Open Online Course: MOOCs.

However, whether the education management adopted with 21st Century Skills, together with Social & Virtual Learning, will face different problems and obstacles. It's still hard to tell if it worked; therefore remains as a challenge. Also, another challenge is the learner's ability to search for learning outcomes and appropriate approaches to further study.

#### IV. CONCLUSION

The digital age has brought significant lifestyle changes and learning management must keep pace with these changes. Education 4.0 specifically refers to the process of reimagining education in response to a more creative world. The definition of 21st century skills education alone is not enough; learning management must be considered in the context of social and virtual learning; graduates must be intellectuals; and, ultimately, they must help build a smart nation. There are challenges in creating people who can take advantage of new technological advances such as intelligent agents and mobile technologies and services that are compatible with the learning management model outlined above. The ability of students to go further in their research is still a problem.

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