BASIC CONCEPTS AND LEARNING STRATEGIES IN THE INDUSTRIAL REVOLUTION 4.0 ERA

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Cover Design:
Tahta Media

Editor:
Tahta Media

Proofreader:
Tahta Media

Size:
ix, 154, Uk: 15,5 x 23 cm

ISBN: 978-623-147-300-4

First Print:
January 2024

PENERBIT TAHTA MEDIA GROUP
(Publishing Group : CV TAHTA MEDIA GROUP)
IKAPI member (216/JTE/2021)

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CHAPTER 1
BASIC CONCEPTS OF EDUCATION

Dr. Rukun Santoso, S.E., M.M., M.Si.
Universitas Islam Jakarta

A. INTRODUCTION TO BASIC CONCEPTS OF EDUCATION

Education is a very important process in human life. Through education, individuals can gain knowledge, skills, attitudes and values that are important for building a better life. As a complex concept, education involves various aspects and factors that influence it. In this article, we will explain the basic concepts of education, including its definition, purpose and components.

Definitions of education very widely depending on the perspective used. According to UNESCO (2023), education is an ongoing process that involves the transfer of knowledge, skills and values from one generation to the next. Meanwhile, according to Dewey (1938), education is a process of processing experience. This means that education is not only about knowledge and skills, but also experiences encountered in life.

The purpose of education is very important to understand, as it guides the design of educational programs. The main purpose of education is to create qualified and independent individuals, who can take an important role in society. This is supported by Freire's opinion (1970), that education should aim to liberate human from oppression

and enable them to take an activerole in society.

The main components of education include teachers, students, curriculum and learningenvironment. Teachers have an important role as facilitators in the educational process, by facilitating the transfer of knowledge, skills and values to students. Students, as recipients of education, have an active role in the learning process, taking responsibility for acquiring the necessary knowledge and skills. The curriculum is a guide in the learning process, and mustbe designed in a systematic and structured manner in order to achieve educational goals. Finally, the learning environment should facilitate effective learning by providing the necessary facilities and resources.

Overall, education is a complex and multidimensional process. Its definition, purpose and components need to be well understood in order to design effective and quality education programs. According to the famous educational figure, Freire (1970), education is a political act involving human freedom and the skills to fight for that freedom. Therefore, education should aim to empower individuals to reach their full potential and to fight for justice and equality in society.

The main purpose of education is to create qualified and self-reliant individuals, who can take an important role in society. Freire (1970) also emphasizes the importance of education in liberating man from oppression and enabling him to take an active role in society. Thus, education should aim to empower individuals to reach their full potential and tostrive for justice and equality in society.

The main components of education are teachers, students, curriculum and learning environment. Teachers have an important role as facilitators in the educational process, by facilitating the transfer of knowledge, skills and values to students. Students, as recipients of education, have an active role in the learning process, taking responsibility for acquiring the necessary knowledge and skills. The curriculum is a guide in the learning process, and mustbe designed in a systematic and structured manner in order to achieve educational

goals. Finally, the learning environment should facilitate effective learning by providing the necessary facilities and resources.

Overall, education is a very important process in human life. Its definition, purpose and main components must be well understood to design effective and quality education programs. Education should aim to empower individuals to reach their full potential and to strive for justice and equality in society.

In addition to the main components, there are also some basic concepts in education that must be understood. The first concept is diversity, which emphasizes the importance of respecting differences in society and ensuring that all individuals have equal opportunities for quality education. The second concept is inclusion, which emphasizes the importance of ensuring that all individuals, regardless of their background, can participate fully in the education process.

The third concept is empowerment, which emphasizes the importance of giving individuals the skills, knowledge and confidence to take an active role in society and fight for justice and equality. The fourth concept is collaboration, which emphasizes the importance of working together in the educational process, both between students and between students with teachers, to achieve educational goals.

The fifth concept is reflection, which emphasizes the importance of helping studentsto understand and reflect on their experiences in the educational process, so that they can learn from their mistakes and improve their abilities sustainably. The last concept is self-development, which emphasizes the importance of helping students to develop their potential and interests, so that they can achieve their goals and aspirations more effectively.

Overall, these basic concepts are important in designing effective and inclusive education programs. By understanding diversity, inclusion, empowerment, collaboration, reflection and self-development, education can help individuals to reach their full potentialand to strive for justice and equality in society.

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The author was born in Lamongan, June 18, 1959. He has been pursuing the field of management since he was a student at the University of Indonesia majoring in Commercial Administration, graduating in 1997, obtained a Master's degree from the University of Indonesia majoring in Fiscal Administration, graduating in 2003. While the Doctoral degree was obtained at Pancasila University majoring in Economics (Business Strategy) graduated in 2020. In the course of his career, he has been a finance director in state-owned and private companies. The author is also active in politics and has been the Chairman of the DKI Jakarta DPRD faction. In addition, he is active in various organizations, including the Chairman of ASPEKINDO, Deputy Chairman of DPP HKTI, Deputy Chairman of SAHI, Deputy Chairman of ISEI DKI Jakarta, Board of Trustees of Masika ICMI, Board of Trustees of Iluni University of Indosia, Board of Trustees of the Ummul Mukminin Waqf Foundation, Deputy Chairman of KSU SAHI MAJU BERSAMA Cooperative, K-MERSII Advisory Board, Currently active as a permanent lecturer at the Jakarta Islamic University Postgraduate Program, an adjunct lecturer at the STIAMI Postgraduate Program, an adjunct lecturer at the Faculty of Economics, Pancasila University and as an adjunct lecturer at various other campuses, actively in writing books, national and international journals.

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CHAPTER 2
INDUSTRIAL REVOLUTION 4.0

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A. INTRODUCTION

In this recent era, technology has been used in many sectors. Traditional ways are changed by using technology. There is a change in the form of technology, artificial intelligence, and robotic in industrial revolution 4.0 (Harahap & Rafika, 2020). Technology develops in several ways. Artificial intelligence and robotic grow faster. They are used by human being to fulfill many tasks. Many things can be done faster by using artificial intelligence. Works can be done by a robot.

Industrial revolution 4.0 has given impacts to many things. They are technology, education, economy, and society. The development of technology has given impacts to the process in pedagogy, economy, and society. Everything is run digitally. Emerging and new technologies developed over time during indutrial revolution 4.0 (Halili et al., 2021). People need to adapt to use new technologies in their lives.

"The term "Industry 4.0" has been popularized by the World Economic Forum to describe the trends towards to technologies and processes, including cyber-physical systems, Internet of things, cloud

computing, artificial intelligence, computer generated product design, three-dimensional (3D) printing" (Tikhonova & Raitskaya, 2023). They are several new technologies developed in industry 4.0.

Education experiences various changes to be digitized. Many educators and students use technology in their studies. Economy has also changed and is more digital. Wibowo and Munadi in Amin et al. (2023) stated that "the industrial world is facing the industrial revolution 4.0, which departs from a German government project to promote manufacturing computerization by utilizing cyber, physical, and manufacturing collaboration". Other than education and economy, industrial revolution has also changed the way people collaborates.

There are several definitions of industrial revolution 4.0. First, Shwab in Benny Syahputra et al. (2021) stated that "the term Industrial Revolution 4.0 itself is used to refer to an era that offers a quality of life with the application of high technology in the fields of computers and communications". Second, it is stated that "this phase of change is known as the Industrial Revolution 4.0, a phase that is generally about automation and exchange of data in factory technology, robotic and artificial intelligence" (Harahap & Rafika, 2020). Third, it is stated that "industry 4.0 (I4.0) is the next step of the industrial revolution that can potentially further transform production flow and change the communication between humans and machines as well as the interaction between suppliers, producers, and customers" (Suleiman et al., 2022).

This chapter discusses the introduction, history of introduction revolution 4.0, industrial revolution 4.0 and technology, industrial revolution 4.0 and pedagogy, industrial revolution 4.0 and economy, industrial revolution 4.0 and society, and also advantages and challenges of industrial revolution 4.0.

B. HISTORY OF INDUSTRIAL REVOLUTION 4.0

Industrial revolution has several phases. They are industrial revolution 1.0, industrial revolution 2.0, industrial revolution 3.0, and industrial revolution 4.0.

1. Industrial Revolution 1.0

   Industrial revolution 1.0 happened in United Kingdom. The changes were in the form of discovery of spinners, innovation in manufacturing, and discovery of steam engines. Industrial revolution 1.0 was more on steam engines. Previously, human being still used muscle power, wind, and water (Nurdiana & Pandin, 2021). Industrial revolution 1.0 was in the 18th century and it was also marked by water power and energy of output and agriculture used mechanized engines (Sharma & Singh, 2020).

2. Industrial Revolution 2.0

   Industrial revolution 2.0 happened in the form of discovery of electric power. Electric power changes steam engines in industrial revolution 1.0. Then, there was a shift of society from agrarian society to industrial society (Nurdiana & Pandin, 2021).

3. Industrial Revolution 3.0

   Industrial revolution 3.0 happened in the form of discovery of computer. Information spread widely. Computer developed from the small one to the one that can be used for production (Nurdiana & Pandin, 2021). Industrial revolution 3.0 was marked with the using of memory programmable controls, computer, and robot (Sharma & Singh, 2020). Many computer based technologies are invented. They are computer-based integrated manufacturing (CIM), computer-aided design (CAD), and computer-aided manufacturing (CAM) (Sharma & Singh, 2020).

4. Industrial Revolution 4.0

   Industrial revolution 4.0 happen in the form of discovery of digital technology. It is marked by the development of advanced computer, artificial intelligence, and machines in virtual (Nurdiana

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CHAPTER 3
EDUCATION AND INDUSTRIAL REVOLUTION 4.0

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A. INTRODUCTION

Changes in the era of information and communication technology are very fast through the Industrial Revolution 4.0, so it is necessary to prepare adequate human resources to be able to compete on a global scale. Improving the quality of human resources through non-formal education and formal education, namely primary education, secondary education and tertiary education, is the key to being able to keep up with the development of the Industrial Revolution 4.0 (Lase, 2019).

The rapid development of science and technology, especially in the era of the industrial revolution 4.0, can have a big impact on activities in human life. Many conveniences and innovations have been made in the educational aspect due to the support of digital technology (Hasrul et al, 2019).

Hermann et al (2015); Irianto (2017) quoted by Hasrul et al (2019) stated that the era of globalization is a new era called Industrial

Revolution 4.0. The history of the industrial revolution starts from industry 1.0, 2.0, 3.0, to industry 4.0. The industrial phase is a real change from existing changes. Industry 1.0 is characterized by mechanization of production to support the effectiveness and efficiency of human activities, industry 2.0 is characterized by mass production and quality standardization, industry 3.0 is characterized by mass customization and the flexibility of automatic and robot-based manufacturing. Industry 4.0 then came to replace Industry 3.0 which was characterized by cyber- physical and manufacturing collaboration. The term Industry 4.0 comes from a project initiated by the German government to promote the computerization of manufacturing.

Education in the Industrial Revolution Era 4.0 is a phenomenon that responds to the needs of the industrial revolution by adapting the new curriculum to current conditions. This curriculum is able to open a window to the world through the hand, for example utilizing the internet of things (IoT) (Putriani and Hudaibah, 2021). Thus, the Industrial Revolution 4.0 era encourages the world of education to follow technological developments and utilize information and communication technology as sophisticated facilities to facilitate the learning process.

Implementing education 4.0 requires harmony between humans and information technology in order to find solutions that can be used to solve various problems that arise, and can create creative and innovative opportunities to improve sectors of life. This requires teachers, whether they like it or not, to study technology in order to transfer knowledge to students through online teaching and learning activities, so that students can understand information technology.

B. CONCEPT OF INDUSTRIAL REVOLUTION 4.0

Industrial Revolution 4.0 is a strategic and drastic change in production patterns through the collaboration of three main

dimensions, namely humans, technology/machines, and big data (Sumartono & Huda, 2020). Currently, the world has entered the era of the industrial revolution generation 4.0, which is characterized by increasing connectivity, interaction and the development of digital, artificial intelligence and virtual systems. With the increasingly converging boundaries between humans, machines and other resources, information and communication technology will certainly have an impact on various sectors of life. One of them is the impact on the education system in Indonesia (Lase, 2019).

The concept of industrial revolution 4.0 is a concept first introduced by Professor Klaus Schwab, he is a famous economist from Germany and the founder of the World Economic Forum (WEF). through his book, The Fourth Industrial Revolution, states that the industrial revolution 4.0 can fundamentally change things we live, work, and relate to one another (Lase, 2019).

Lase (2019) describes four stages of industry evolution. First, the first industrial revolution or 1.0 occurred at the end of the 18th century. This is marked with the discovery of the first mechanical loom in in 1784. Second, the Industrial Revolution 2.0 occurred at the beginning of the 20th century. At that time there was an introduction mass production based on division of labor. Third, the beginning of 1970 is considered to be the first emergence of the industrial revolution 3.0 which started with the use of electronics and information technology to automate production. Third, 2018 until now is the era of the Industrial Revolution 4.0. Industry 4.0 is an industry that combines automation technology with cyber technology. This is a trend of automation and data exchange in manufacturing technology. In this era, industry is starting to touch the virtual world, in the form of human, machine and data connectivity, everything is everywhere, or what is known as the Internet of Things (IoT).

Industry 4.0 is here to replace industry 3.0 which is characterized by physical cyber and manufacturing collaboration. Lee, Lapira,

Bagheri, & Kao quoted (Lase, 2019) that industry 4.0 is characterized by increasing digitalization of manufacturing driven by four factors: (1) increasing data volume, computing power, and connectivity; (2) the emergence of analytics, capabilities, and business intelligence; (3) the emergence of new forms of interaction between humans and machines; and (4) improvements in transferring digital instructions to the physical world, such as robotics and 3D printing. The basic principle of industry 4.0 is the integration of machines, workflows and systems, by implementing intelligent networks along production chains and processes to control each other independently . Herman (2016) quoted by Lase (2019) explains that there are four design principles for Industry 4.0. First, interconnection, namely the ability of machines, devices, sensors and people to connect and communicate with each other via the Internet of Things (IoT) or the Internet of People (IoP).

Maemunah (2018); Annisa (2021); Putriani & Hudaidah (2021); & Ghufron (2018) quoted by Lukum (2019) stated that the industrial revolution 4.0 basically changed life patterns, thought patterns, and work patterns in relation to each other. The changes are very drastic compared to the previous revolutionary era. The Industrial Revolution was a major change in technology that caused changes in other fields. The industrial revolution began in 1750. The industrial revolution 1.0 was marked by the growth of mechanization and steam and water-based energy (the invention of the steam engine), human and animal power was replaced by machines, the highest achievement in the 18th century which was accompanied by an increase in the economies of countries in the world. to six times the per capita income. Changes in the Industrial Revolution 2.0 were marked by the development of electrical energy and motor drives used for mass production. The highest achievements in this era were telephones, cars and airplanes. The Industrial Revolution 3.0 era is quite fast changing, marked by the growth of industries based on electronics, information technology and automation. Industrial Revolution 4.0 is marked by the development

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CHAPTER 4
TEACHER COMPETENCIES DEVELOPMENT 4.0

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A. THE ERA OF EDUCATION IN INDUSTRIAL REVOLUTION 4.0

The swift advancement of technology has significantly impacted multiple domains, including the industrial sector. By merging digital and physical technologies, the Industrial Revolution 4.0 transforms the industrial system into one that is more flexible, efficient, and integrated across several networks. The Industrial Revolution 4.0 offers a huge opportunity, but the road ahead is undoubtedly difficult; there are numerous barriers, difficulties, and problems that require solving. This phenomenon also affects the education sector, and it calls for the development of a solution so that learning in the context of the fourth industrial revolution improves educational quality, particularly by increasing output and outcomes to meet the demands of the labor market and address the demands of current developments.

One of the key benefits of industry 4.0 for education is increased network connectivity, particularly via the Internet of Things (IoT). Greater connectivity would allow the education system to be implemented more efficiently and track results directly through time and distance measurements. Effectively and efficiently, the field of

education can also create collaborative networks at the local, national, and worldwide levels. Making it simpler and quicker to keep an eye on the educational process and ensure success allows for the quicker adoption of fixes when problems are identified. In addition, technology like artificial intelligence and big data can assist the field of education in problem solving and in reaching more accurate and useful conclusions.

In order to embrace Industrial Revolution 4.0 and be prepared for challenges, the education sector needs to prepare for a number of things. The fact that the fourth industrial revolution also calls for human resources with the necessary technological know-how and skill sets presents one of the major obstacles. This might be difficult for businesses that have to change swiftly to suit the demands of a market that is changing quickly. Teachers, support personnel, and students are among the human resources in schools that need to be tech-savvy. In addition to technology, there are approaches to learning and competences for teachers that meet the requirements of the fourth industrial revolution. The results of Nuraeni's research (2019) show that many people are less creative in designing worksheets, only using those that are available in books from the government or books from publishers. Many teachers also lack the ability to design learning and learning tools based on the industrial revolution 4.0.

Educational theorists use the term of Education 4.0 refers to a broad range of approaches to both directly and indirectly incorporate cyber technology into the classroom. Education 3.0 brought together cognitive psychology, neuroscience, and educational technology through the use of web-based digital and mobile technologies, hardware, software, and other items with a "e" in front of them. This improvement is a significant step forward from that. The advent of the fourth industrial revolution, where humans and robots work together to solve problems and create new opportunities, is what education 4.0 is all about (Asep Suhendar, 2021).

"What do we know about Revolution Industrial 4.0?"Industry 4.0, also known as the intelligent industry, is considered to be the fourth industrial revolution, a term coined by Professor Schwab and seeks to transform a company into an intelligent organization to achieve the best business results.Theindustrial revolution 40, but the adoption of digital technology has reached a point where we are ready for another radical change, the digital transformation of the industry or what we call industry 4.0."(Ilyas, 2019).

"The future as Industry 4.0 unfolds, computers are connected and communicate with one another to ultimately make decisions without human involvement. A combination of cyber-physical systems, the Internet of Things and the Internet of Systems make Industry 4.0 possible and the smart factory a reality. As a result of the support of smart machines that keep getting smarter as they get access to more data, our factories will become more efficient and productive and less wasteful (Marr, 2019). (Gregory Clark, 2010).

Education specialists outline many ways of incorporating cyber technology into learning in the period of industrial revolution 4.0, both physically and non-physically. The phenomenon of education in the fourth industrial revolution era is a response to the demands of the revolution by modifying the curriculum to fit the circumstances of the day. By using the internet of things (IOT), for instance, this curriculum can provide a portal to the world right in your palm. In the age of the fourth industrial revolution, educators need to expand their repertoire of resources and pedagogical approaches. The fact that instructors are eager to put it into practice needs to be supported.

Quoted from Kompasiana (2019) in Asih (2020), there are at least 4 competencies that teachers are expected to have in the era of industrial revolution 4.0, namely:

1. Critical thinking and problem-solving skills. It is the ability to understand a problem, get as much information as possible so that it can be elaborated and come up with various perspectives to solve

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CHAPTER 5
CREATIVITY

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A. INTRODUCTION

In first two decades of the 21st century, creativity was becoming a popular focus globally. For example, as Bronson and Merryman indicated, 2009 was designated as the European Year of Creativity and Innovation with the slogan "Imagine. Create. Innovate." and the mission of "Raising awareness of the importance of creativity and innovation. As we all know, the development of human civilization has been driving by creativity. There is no doubt that the development of human civilization benefits a lot from creativity, without which it is impossible for us to live in such a modern society. However, there is little research on creativity in domain of philosophy. On the contrary, there is a large amount of work in the domain of psychology on creativity, which has provided rich resources for philosophical research on creativity but has been neglected by philosophers (Gaut 2010). However, have we ever seriously thought about what creativity is? What are the origins of the concept of creativity? Do people in the West and the East have same understanding of creativity? Does the concept of creativity have the same roots? Is moral goodness necessary in the conception of creativity?

Fostering creativity in education is intended to address many concerns. Creativity researchers have long paid careful attention to

individual creativity, beginning with studies of well-known geniuses, and expanding to personality, biographical, cognitive, and social-psychological studies of individual creative behaviour. Developing children's creativity during their years in education is the start of building "human capital" upon which, according to Adam Smith and successive commentators, depends the "wealth of nations" (Walberg, 1988).

B. MEANING OF CREATIVITY

What is creativity? There are many definitions of the term, and they may vary from one to another. In the terminology of psychology, creativity is defined as the ability to produce original work or thoughts. Originality and imagination are traits typically held by creative individuals. Intelligence is the ability to gain information, learn from experiences, adapt to one's environment, and use reasoning skills. Creativity is viewed basically as an attitude toward life and one's work, but also has cognitive, affective, motivational, and environmental components (Stenberg, R.J, 2018). The first is that creativity has a divine origin, which means all creativity emanates from one God or from the endless inspiration of many gods. The second emphasizes individual creativity which is opposed to divinely inspired creativity, and it is based on the notion that creativity originates in the human mind and in the human's ability to bring something new into being (Wight, 1998).

Creativity is a type of thinking that enables people to generate ideas, invent new ideas, improve old ideas, and recombine existing ideas in a novel fashion (Gallagher & Gallagher, 1994). Creativity is an encounter of the interestedly conscious human being with his or her world; the process of bringing something new into being (May, 1975). Behaviorally creativity can be defined as the ability to produce work that is novel, high in quality, and appropriate (Feldman,

Csikszentmihalyi & Gardner, 1994; Sternberg & Lubart, 1999). Novel here means that the work is original or unique, something nobody has thought of or done before. Appropriate in this context means that the work is of some aesthetic or pragmatic value (Starko, 2005; Swartz & Perkins, 1990). Torrance describes creativity as "the process of sensing difficulties, problems, gaps in information, missing elements, something askew; making guesses and formulating hypotheses about these deficiencies; evaluating and testing these guess and hypothesis; possibly revising and retesting them; and last, communicating the results" (1993, p 233)

Creativity often be said with cognitive theory and intelligence. Piaget as one expert cognitive "the function of the development of the cognitive system is to change the thinking power, including creativity that involves adaptation, organization, and eqilibrasi". Creativity is a function of assimilation and accommodation together to form new knowledge as a scheme of action in achieving equilibrium. In the process of assimilating information from the environment included in the cognitive structure, adapted to the schemata of action and mental structures preceding (a given situation). in this process which primarily is what is essential to all knowing, in that it relates to the principle someness-communality, and generalization (Astutik & Prahani, 2018). In the aspect of intelligence, creativity using thinking skills to create or generate creative ideas said. "there is much evidence of substantial, positive correlations IQ as measured by an intelligence test and Certain creative talent ..."

C. THEORY OF CREATIVITY

According to the triangular theory, creative individuals defy the crowd (other people and their conscious beliefs), themselves (the individual), and/or the Zeitgeist (the shared and often unconscious

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CHAPTER 6
LEARNING STRATEGIES IN THE INDUSTRIAL ERA 4.0

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A. INTRODUCTION

In the current era of industry 4.0 which is developing very fast, education is one of those impacted by changes that occur in the internal and external environment of the organization. Digital-based education in the 4.0 era provides challenges and opportunities that are increasingly changing rapidly. Higher education is one of the levels of formal education in Indonesia. Higher education is a pattern of education that aims to produce competent and professional graduates. In the current era of disruption and responding to the challenges of rapidly changing technology, very comprehensive preparation and competence in the field of information technology is required. Starting with the Industry 4.0 revolution in 2012, which emerged through internal engineering and the internet of things (IoT) and became the movement and connectivity between humans and machines, including in the field of education.

The COVID-19 pandemic has made the education system change drastically from the concept of face-to-face learning to online. These changes foster an atmosphere and learning process that must optimize digital concepts based on internet use, not limited by space and place

so that the learning process can continue to run smoothly. The concept of learning in state universities is encouraged to prepare a distance education system or cyber university such as an open university. The cyber university concept has opened up space and opportunities for universities in the aspects of planning, implementation, control and evaluation.

In the planning stage of higher education, it is necessary to pay attention to how cyber universities are able to respond to the demands and changes of the Industry 4.0 revolution, such as:

1. preparation in the tertiary learning system: in this stage, learning have to prepare with the system used in higher education;
2. reconstruction of policies related to institutions: how the policy canimpact of learning strategies system in higher education, especially in conjuction with challenge of information technology;
3. preparation of competent human resources: in current condition, human as a capital in organization, not only capital such land, machines, cash money but also human itself become more important for organization to win competitive advantage.

Changes in the concept of learning using information technology have provided a picture of results that no longer focus on conventional learning, but provide opportunities and motivation for students to be able to utilize technological media such as: videos and digital modules. In learning process is urgent to know what kind of strategy have to be done in higher education? strategy can used in learning process not only have a benefit for the students but also for the lecturer.

Strategy is the grand design or an overall of plan which an organization chooses in order to move or react towards the set objectives by using its resources. An organization is considered efficient and operationally effective if it is characterized by coordination between objectives and also strategies. Strategy not used in education, but also in military and business, strategy in military talking about how the strategy for a battle refers to a general plan of

attack or defense. The strategy is concerned with the employment already deployed. In business, strategy used for business strategy realized that one part of intended the plan and emergent given, such as strategy as realized, and strategy as intended.

The learning activities and strategies have been organized under the basic elements of an inquiry process, such as:

1. Tuning in strategies provide opportunity for the students to explore their current knowledge, attitudes and values
2. Finding out strategies help the student's identify gaps in their existing knowledge and can understanding of key health, safety and resilience and wellbeing concepts, and work collaboratively to gather information through self-directed investigation
3. Sorting out strategies encourage the students to sort, analyse, organize, review, compare and contrast of information
4. Reflecting strategies allow the students to identify, discuss and consider changes in their understandings, skills, attitudes and values.

In current conditions, learning is becoming more: (a) mobile: geographic proximity does not matter for access to content and tools, (b) social: social media is having a substantial impact on the way we interact, (c) learning-style friendly: content is available in different forms, and (d) accessible and on-demand. Refer to Baker (2011) learning also provides relevance and impact for the increasing diversity in mission/job requirements, not depend on takking clasess, enables greater informal learning through networking sith expert, helps learners understanda where their learning gaps and be focus on their learning efforts, and captures in a consistent and useful way the experience and knowledge resident in workforce. Learning strategies are techniques, approaches, or thoughtful actions that students take to learn and remember linguistic information and content area.

In 21st century, talking about learning strategies are steps taken by learners to enhance their learning such as learning strategies help

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CHAPTER 7
LEARNING COLLABORATION

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A. INTRODUCTION

Learning is a goal-oriented activity that teaches students to obtain the skills they need. Learning is an intricate process which is affected by a number of factors such as teachers, students, facilities, media, and the environment. Teachers have a critical role in ensuring optimal learning. Teachers must not only serve as information providers, but also as motivators and facilitators in developing students' interest in acquiring knowledge on their own. The initial development of collaborative learning begins with a philosophical viewpoint on the idea of learning. To learn, one must have a partner. Collaborative learning can create opportunity for successful learning practices. According to Sato (2015, p. 40), collaborative learning is based on Vygotsky's zone of proximal development theory and Dewey's communication theory, which states that learning activities are known as sociocultural practices through interactive communication activities (collaboration), which form active reflective learning. Consequently, collaborative learning becomes more focused on cultural practices (cognitive activities with cultural content) rather than cooperative partnerships, stressing the social practice of learning as the

construction of meaning and relationships. Collaborative learning attempts to establish mutual listening relationships (Sato, 2015, pp. 40–41).

Beginning with varied classrooms, providing learning or lectures in such settings is a challenge for any teacher or lecturer. The most challenging task is determining how teachers or lecturers may plan and deliver learning or lectures which acknowledge each student's right to meaningful learning. The selection of problems to guide the learning process is an obstacle in and of itself in relation to the problem-based learning (PBL) approach currently recommended by many teaching experts, since a question or problem that is difficult for one group of students may not be a problem for another group of students.

To cope with student differences across many aspects, including motivation and intellectual level, performing learning or lectures in small groups might be a possible strategy (Felder & Brent, 2005). However, the questions that arise are: how should these groups be formed, how should students learn in their groups, how should material or assignments be given, how should each student take a role in their group, and how should the teacher or lecturer involve themselves in groups, so that each student can be ensured the right to meaningful learning?

Collaborative learning is a term used to describe how teachers help students work together on collaborative assignments both within and outside of the classroom. This entails Vygotsky's learning model (1978). Vygotsky's learning model developed, end the dominant position of Piaget's learning theory (1976), which stressed aspects of human biology, namely learning in the human instinctive element. As a person's biological age grows, so will his or her learning potential. Humans have biological systems that alter their learning skill as they develop. This strategy takes into account the presence of other people in a learning environment (K. Zaretskii, 2017, pp. 98–99)

Other individual's presence is not merely an extension or a means for individual learners to quench their curiosity, but rather a complementing presence. Complementary presence refers to a group of people engaging, collaborating, and complementing one another in a learning area through various sorts of activities. Social relationships in the learning setting can produce a "difference gap," which serves as a catalyst for curiosity and the practical application of the learning process (Lantolf, 2000). Learning is essentially an endeavor to satisfy an individual's curiosity (Litman, 2005). This suggests that the social learning model can cultivate an ability that drives someone to find something new. A comprehensive understanding is required when using collaborative learning practices as part of social learning in the classroom. The reason for this is based on the difference gap. Individuals hold various skills for collaborative learning participation and involvement. This is frequently seen as a flaw, even a threat to learning success.

Into more practical understanding, learning has to be regulated so that students can develop beyond their boundaries. To begin, teachers must assign more difficult learning material than normal. Students in the higher group will not be able to learn in detail if this is not accomplished. Simultaneously, the teacher must be able to actively offer questions geared for the lower group. This may be accomplished by organizing groups for collaborative learning (Manabu Sato, 2007).

Table 7.1. A brief comparison of collaborative and traditional learning methods.

No	Aspects	Collaborative	Conventional
1.	Meaningful learning	Experienced by lower, middle and upper group students	Only students in the middle group experienced
2.	Level of learning material	Set at a higher-than-normal level of	The material is not set too high so that

		material, thereby challenging students.	students are not troubled.
3.	Grouping students.	Small groups are established to work together to solve problems.	There is no group formation.
4.	The courage to ask for help	Students in the lower group who have difficulties solving problems gather the courage to seek help from other students.	Students tend to address problems on their own and face their own challenges, raising their chances of failure in learning.
5.	Leaping in learning	A learning leap happens (all students achieve a greater level of learning).	Leaping learning is experienced by only a small number of students.
6.	Focus	Learning does not happen in a void, but rather as a result of diversity and heterogeneity.	Learning occurs in unity.
7.	Opportunities for discussion	There are several opportunities for students to discuss and share their thoughts.	There are not enough opportunities.
8.	Efficiency	Highly effective since all students are actively participating in studying, offering excellent possibilities for students to advance their learning.	The efficiency is very low, it does not involve students in grasping the learning material, and it inhibits the interest of students

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CHAPTER 8
EDUCATING ACCORDING TO THE AGE
LIFE SKILLS EDUCATION IN INDUSTRY 4.0 AGE

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A. DEFINING LIFE SKILLS

The term 'life skills' has been defined by various organizations in respect to the context that the term is applicable to their own programmatic focuses and strategies. For example, the World Health Organization (WHO), considers life skills in the specific context of health and defines them as abilities that support adaptive and positive behaviors that enable individuals to deal effectively with the demands and challenges of everyday life. Life skills are also said to be a set of abilities, attitudes and socio-emotional competencies that enable individuals to learn, make informed decisions and exercise rights to lead a healthy and productive life and subsequently become agents of change. (UNICEF, 2019)

The knowledge, skills, and attitudes (KSA) approach can bring about the change envisaged when individuals apply these skills.

Establishing baseline understanding of knowledge (what one knows), skills (what one can do) and attitudes (what one believes and values) help teachers to be more purposeful not only when reinforcing life skills but also when applying such competencies to help young learners navigate unique challenges at pivotal moments across individual's life and in different contexts. (Kwauk and Braga, 2017)

B. LIFE SKILLS EDUCATION

Life Skills Education includes a set of interrelated skills that should empower children and adolescents to lead a healthy, successful life and assume social responsibility (OECD, 2019). Life Skills Education can also be seen as a cognitive behavioral approach that generally links issues such as exposure to social influences and social norms with the promotion of cognitive, affective, and social skills (Peters et al, 2009). According to Kirchhoff and Keller (2021), the World Health Organization stated that life skills education includes the promotion of three categories of life skills: 1) communication and interpersonal skills, 2) decision-making and critical thinking skills, and 3) coping and self-management skills. The classification of these life skills can be viewed in the Table 1.

Table 8.1. Classification of Life Skills in Three Categories

Communication and Interpersonal Skills	Decision-making and Critical Thinking Skills	Coping and Self-Management Skills
Interpersonal communication skills Negotiation/refusal skills Empathy building Cooperation and teamwork	Problem-solving skills Critical thinking skills Creative thinking skills	Skills for increasing personal confidence and abilities to assume control, take responsibility, make a difference, or bring about change

Advocacy skills	Skills for managing feelings Skills for managing stress

Source: Kirchhoff and Keller (2021)

We can see that life skills education takes into psychosocial competencies and interpersonal skills that help students to take right decisions, solve problems, think critically and creatively, communicate effectively, build healthy relationships, empathize with others, and cope with managing their lives in a healthy and productive manner. Life skills have been classified into three broad categories: thinking skills, social skills, and emotional skills. Thinking skills enhances the logical faculty of the brain using an analytical ability, thinking creatively and critically, and developing problem-solving skills and improving decision-making abilities. Social skills include interpersonal skills, communication skills, leadership skills, management skills, advocacy skills, co-operation and team building skills. Emotional skills include knowing and being comfortable with oneself. Thus, self-management, including managing/coping with feelings, emotions, stress and resisting peer and family pressure.

According to UNICEF, there are four dimensions of skills: empowerment, citizenship skills, learning skills, and skills for employability. The classification of each dimension of skills can be viewed in this Figure 1 below.

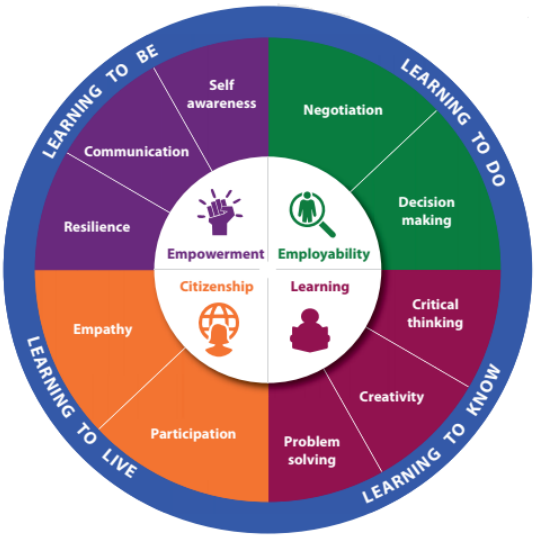

Figure 8.1. Classification of the Four Dimensions of Skills (Source: UNICEF, 2019)

Resilience includes skills of coping with stress and coping with emotions, perseverance, trust and relationship-building. Empathy is built-in as part of interpersonal and participation skills. Self-awareness and critical thinking are important to successfully navigate education opportunities and develop the skills need for the future. Self-awareness includes self-esteem, self-care and dignity affirmation; while critical thinking includes knowledge of rights and identification of unequal power relationships, amongst other related skills. Citizenship skills involve understanding and practicing citizenship concepts: democracy, fairness, justice, rights, responsibilities, equal opportunities, equity and equality, identity, cohesion, ethics, legislations, etc. These skills also include skills of critical thinking, participation skills (deliberating civilly, monitoring the government, building coalitions, managing conflict peacefully and fairly, and petitioning, speaking or testifying before public bodies), decision making, negotiation and skills for communication. Citizenship skills include specific skills from all the four dimensions: communication,

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The author is a mathematics lecturer in Institut Teknologi dan Bisnis Yadika Pasuruan since 2022 and in Sekolah Tinggi Manajemen dan Ilmu Komputer Yadika since 2015. The author completed her bachelor and master degree in Mathematcs Education, in State University of Malang. As an educator, the author has joined some training to develop the skills especially in teaching, research, and community service. The author has completed twice grant funding program of research for beginner lecturer, both as a chief researcher. In the research program, the author specified in the field of learning media development based on technology. The author has published a book and it is entitled Bahan Ajar Aljabar Linear pada Materi Sistem Persamaan Linear dengan Microsoft Excel dan MATLAB.

This book was written by a number of Lecturers and Practitioners from various Institutions according to their expertise and from various regions in Indonesia. It is hoped that the publication of this book can make a positive contribution to science and of course provide a different nuance from other similar books and complement each other in each discussion, namely in terms of the concepts contained so that it is easy to understand. The systematics of the book entitled "Basic Concepts And Learning Strategies In The Industrial Revolution 4.0 Era" consists of 8 chapters which are explained in detail as follows:

Chapter 1 Basic Concepts Of Education
Chapter 2 Industrial Revolution 4.0
Chapter 3 Education And Industrial Revolution 4.0
Chapter 4 Teacher Competencies Development 4.0
Chapter 5 Creativity
Chapter 6 Learning Strategies In The Industrial Era 4.0
Chapter 7 Learning Collaboration
Chapter 8 Educating According To The Age Life Skills Education In Industry 4.0 Age

Finally, we would like to thank all those who supported the preparation and publication of this book. Hopefully this book can be useful for all readers.

CV. Tahta Media Group
Surakarta, Jawa Tengah
Web : www.tahtamedia.com
Ig : tahtamediagroup
Telp/WA : +62 896 5427 3996

ISBN 978-623-147-300-4