

The Readiness of Teacher's Digital Capabilities Toward the Fourth Industrial Revolution Era (Industrial Revolution 4.0)

Muhammad Soleh Hapudin

Faculty of Teacher Training and Education, Universitas Esa Unggul, Indonesia

Corresponding author: soleh.hapudin@esaunggul.ac.id

Abstract: The purpose of this research was to determine the readiness and ability of teachers to face information and communication technology-based learning in the Industrial Revolution Era 4.0. The research method in this article is qualitative. The type is literature research, and the data analysis is descriptive analysis. Data obtained from library research. The data collection technique used by this researcher is a literature study. Data analysis techniques in this study use qualitative analysis techniques in a deductive way. Technology is developing exponentially, changing the way humans move, communicate, communicate and interact. Especially now that there is an era of the Industrial Revolution 4.0 known as the era of disruption. Education is one aspect affected by RI 4.0. Learning 4.0 requires a technological approach as a tool in the learning process. Teachers need to interconnect with subjects to gain relevant learning experiences. Teachers have only mastered basic applications commonly used daily, but are reluctant to learn to use new applications that can facilitate their work. Teachers in the digital era must have a mindset. In connection with that, teachers are required to be good at using technology in learning. The use of technology in learning is a necessity.

Keywords: Industrial Revolution 4.0, Learning 4.0, disruption.

1. INTRODUCTION

In the century to the 21st, the world is entering the era of the industrial revolution 4.0. The development of the 21st century world is marked with utilization Technology Information and Communication (ICT) in all aspect life (Suryanto, 2022). The progress of ICT in the era of the industrial revolution 4.0 also provides implications in the realm of education. This era is very identical to things related to with *Internet of Things* (IoT), Intelligence artificial (*artificial intelligence*), computer cloud computing. The role of ICT in the era of the industrial revolution 4.0 is a challenge heavy for Indonesian teachers. Aan Komariah et al. (2022;38) stated that education in the era of the Industrial Revolution 4.0 has seen massive use of information technology. Education is one aspect affected by the Industrial Revolution 4.0 (Muis, 2019:33). The Revolution industry 4.0 with indicators of technological disruption that have an impact on education (Piter Lase,). Kahar, Ikhsan et al. (2021) stated that education in the industrial revolution 4.0 era describes various ways of integrating various *cyber*, both physical and non-physical, in learning.

Industry 4.0 is challenge open For development skills 21st century. Skills 21st century among others includes 4C (*critical thinking, communication, collaboration, creative and innovation*), STEM and multiliteracy (Momon Sudarma, 2021:28). The era of the industrial revolution 4.0 has an impact on the role of education, especially the role of education. If the role of educators still maintains as a transmitter of knowledge, then they will will lost role,

along with with technological developments and changes method teach him . This is what drives the need change learning at school .

One of factor the main thing that determines The quality of education is the teacher. Teachers are required to match and surpass development knowledge knowledge and technology . (Darmadi, 2018) . The latest technology No can change the tasks and functions of teachers. This is where the real *challenge lies* . Teachers must be able to utilize the flow of information in creating learning that inspires students, creating more varied, creative and motivating learning . interest participant educate . Progress technology information should be able to support teachers' creativity in applying and developing their knowledge, both related to the learning process and others.

Change ecology education This real and necessary responded to in a way proportional . Changes in Education in the Revolutionary Era industry requires teachers to integrate technology information and communication in learning (Taufik Nur Aziz, 2019). The role of teachers who have so far been the sole provider of knowledge A little Lots shift avoid From it . The more technological developments increase, the heavier the demands on teachers, are teachers ready to face the era of revolution? industry 4.0 . Teachers as power educators , must capable respond change those , create , innovate and adapt to developments of the era . e

Culture learning in the digital era is stimulating presence *e-learning, mobile learning, virtual classroom* or *virtual learning* . According to (Napal et al., 2020) Digitalization has change room Study conventional become a space platform Study virtual . According to (Arianty et al., 2020) to put forward that It is estimated that 70 to 90% of teachers still stuttering technology in learning . According to Fadli (2017) stated that Of the 2.7 million teachers in Indonesia, only 10-15% use technology in classroom learning (Imas Kurniasi, 2023).

However thus in in reality , still there is gap between reality and hope The occurrence change Ecology of Education, namely demands digitalization . (Rahayuningsih & Muhtar, 2022) disclose Still there is some teachers have not capable use technology information and communication and devices gadgets and use various application in learning. This is in line with (Afrizal Purba & Defriyando, 2020) in results his research No all educator capable in utilise technology .

Utilization technology in learning moment This is One inevitability. Starting from technology simple (use application *whatsApp* in learning , until application that provides feature learning look at the face that done by the teacher in class . Therefore that, implications practical The influence of ICT on the world of education is needed teacher competencies that can living in his time . Teachers are required control technology information and

communication. Mastery technology information and communication must made one of teacher competencies that can used For various teacher needs . The question is whether readiness digital skills of teachers facing learning 4.0?. This paper aiming For explaining the steps strategic increase prepare digital skills of teachers in face learning 4.0

2. RESEARCH METHODS

Research methods This use type method qualitative . The type of research used is study library research . According *to* (Sugiono, 2013) state that study qualitative as a method based on philosophy postpositivism aiming find theories new , used For research on conditions natural objects Where researchers as a key instrument . In line with that Bogdan and Biklen (2007) in (Hamzah, 2019) put forward research methods Qualitative is one of the procedure research that produces descriptive data in the form of saying or the writing observed in context certain from corner a complete , comprehensive and holistic view .

Data used in study taken from the data taken research-research previous studies , and previous studies as well as exploration Library materials reviewed in a way holistic , then analyzed based on framework think or theory certain underlying factors .

3. RESULTS AND DISCUSSION

Revolutionary Era Industry 4.0 challengep for Innovative Education . The term industrial revolution first occurred in England in 1784 where invention machine steam and mechanization replace work human . A century then , Electricity and lines assembly allow production in a way mass called revolution industry 2.0, starting entry Electric power , so that help lower cost production . In the 1970s it began enter revolution 3.0 begins when with the entry of computerized systems .

this time , we enter era of revolution industry fourth (4.0). progress technology information that is rolling in the era of the industrial revolution 4.0 allows the occurrence automation in almost everything joints life , including education. The characteristics of The industrial revolution 4.0 is the presence of the internet makes all Can connected known with *Internet of Things* (IoT). The Internet is form product Technology Information and Communication (ICT). In line with development technology , information and communication (ICT) demands on digital era learning . The use of ICT is very depends to the willingness and ability of teachers to use it in the learning process as a medium and source effective learning (Idris, 2015) . In line with That (Alimuddin et al., 2023) to put forward material use technology in learning can increase effectiveness and quality learning .

Why the world of education must changed face it ? There are several reasons , among others, the rapid development technology , change characteristics jobs , more human resource needs Capable , power competition national must increased . According to (Widyastuti, 2022)

In the era of the industrial revolution , all activities and administration school connected with internet network , start from administration school , administration learning , activities learning until reporting everything IT (*information technology*) based , especially abilities and skills and use technology in the learning process especially for teachers.

Current education This faced with a new era , known as with the era of the industrial revolution 4.0. (Doringin et al., 2020) to put forward that Education 4.0 is integrate good cyber technology physique both physical and non- physical to in learning . The Education Era influenced by the Industrial Revolution 4.0 is called Education 4.0. According to (Kurniady, 2022) education in the industrial revolution 4.0 era is marked with existence use technology information massively . The new educational media platform must controlled by all Education actors .

In facing the challenge industrial revolution 4.0 exists a number of aspects that need to be considered prepared among others, *First* preparation of innovative learning systems For produce empowered graduates compete . *Second* , reconstruct regulation Responsive and adaptive educational institutions . *Third* , prepare adaptive , responsive and reliable Dm face industrial revolution 4.0. *Fourth* , rejuvenation facilities and infrastructure and supporting educational infrastructure Success of Education in the Revolution Era industry 4.0 (Taraju et al., 2022) .

1. Learning in Era 4.0

Learning is the core of the educational process . The quality of education describes quality learning . Improvement quality of education can done through improvement quality learning . Currently We Already entering the era of industrial revolution needs will the world of education will technology information is A inevitability , so that teachers are required own ability and competence tall face progress technology (Taraju et al., 2022) . The response of the world of education to presence the industrial revolution is presence the idea of Education 4.0 (Retnaningsih, 2019) . Technology information and communication (ICT). Likewise according to (Farid Ahmadi, 2021) to put forward moreover with the covid pandemic that hit all over parts of the world cause change great , original learning walk in a way conventional must replaced by online learning .

According to (Muhammad Anwar, 2018) ICT devices can utilized more far and effective For increase quality learning . Other benefits obtained , learning can done anywhere in distance far different . The teacher's hope is that do innovation and competence in the learning process and capable increase ability in utilise existing technology .

Mature This student get knowledge in a more environment wide from various source through *cyber space* and growing to *cyber teaching* or virtual learning (Firman , 2009) . (Muhammad Soleh Hapudin, 2022) *cyber teaching* is teaching that uses internet terms other is *e-learning* . According to (Irsyad Kamal, 2020) to put forward that learning in the 4.0 era requires approach technology Good *hardware* and *software*. *Hardware* in the form of computers and smartphones, while *software* device lots of software used .

2. Cyber Pedagogy and its challenges

Teachers in the digital era are faced with conditions participant educate cross generation , namely start generation z to alpha. Both own similarity namely familiar with technology . (Muhammad Soleh Hapudin, 2022) teacher at the moment This faced with the *i-generation* (*internet generation*). Development technology rapid information and communication grow challenge alone for teachers. In Law Number 14 Years 2005 concerning teachers and lecturers , article (1) paragraph (1) states , Teachers are educator professional with task main educate , guide , direct , train , assess and evaluate participant educate . professional teacher marked four competence (pedagogical , personality , social and professional).

Competence the on no Enough If customized with progress , development technology and needs participant educate moment this . (Nurhabibah, 2021) to put forward that technology as a tool at once source Study in process learning so that teachers must own literacy technology . One of the things that can implemented in chase revolution industry 4.0 is using the TPACK (*Technological, Pedagogical, Content Knowledge*) frame .

(Zaki Mubarak, 2018) TPACK is a framework for designing learning models that is based on blend competent in discipline knowledge (*content knowledge*), skills pedagogy (*pedagogy knowledge*), and mastery Technology (*Technological Knowledge*). The era of revolution Industry 4.0 has an impact on the role of education, especially role educators . As the vanguard in the world of education. Tasks and the role of teachers is increasing heavy along with development knowledge knowledge and

technology . (Zaki Mubarak, 2018) to put forward There is a number of challenges that make our world of education skin adapt with industrial revolution between others: inadequate human resources for teachers and lecturers awake in literacy technology , literacy technology and data are literacy is very broad and very fast changed

Teachers must do change and transformation as well as increase competence in facing Education 4.0 (Supandi et al., 2020) . Therefore that teacher must to initiate himself For Keep going do change, changes ability pedagogy that a teacher in the form of *cyber teaching* (Anwar, 2018). Teachers must develop the concept of technology-based pedagogy (*cyber pedagogy*). (Nurhabibah, 2021) *Cyber pedagogy* is the science and art of teaching in an *online environment* . The integration of pedagogical knowledge, content knowledge and technological knowledge creates pedagogical content knowledge and technology.

The educators sued For to renew *knowledge* and *skills* so that they can follow developments of the times, but educators Still experience a number of constraint among others; factors age , availability facilities and infrastructure and constraints others Good nature technical both technical and non- technical (Purwani, 2013) .

Characteristics of 21st century teachers in the information era become characteristics Primarily , teachers must own 5 criteria skills namely , able to facilitate and inspire learning and creativity Study participant educate , design and develop experience learning and assessment in the digital era, becoming a model for how to rich learning with technology and content that can give useful information (Suryanto, 2022). Teachers contribute to designing effective learning so as to provide an optimal experience for students. Teachers in the era of technological advancement will have an impact on learning if they do not align their competencies. It is ironic if teachers are not digitally literate, do not implement e-learning and design ICT-based learning. (Anwar, 2018)

(Nurhabibah, 2021) Teachers must develop fundamental competencies through the use of *ICT tools* in the learning process. Teachers must be creative in delivering lesson materials, so that students are happier in ICT-based learning (Anwar, 2018). According to (Widyastuti, 2022) creative teachers will be skilled at creating interesting learning media. Therefore, teachers in the digital era are required to have skills and create teaching media that can attract students' attention. Learning methods in schools are expected to provide provisions for facing the era of the industrial revolution 4.0 (Suyanti, 2019) .

As teachers in the 4.0 era, educators are required to improve their competence, especially in mastering information and communication technology (R. Eko Indrajit, 2021:59). Improving teacher competence can be done in various ways, both inside and outside network (Abdul Muis, 2019:33). Use ICT will increase quality of education, where participants educate will motivated , get skills base For increase Quality of education and realizing a society based on knowledge .

4. CONCLUSION

Based on studies that have been writer do is there is a number of points that can be taken in the current digital era , teachers must be technology literate. Being technology literate at least has matter among them , *First* , awake regulation . *Second* , software literacy . *Third*, hardware literacy. *Fourth* , internet literacy. Teachers must continue to adapt and align with the developments of the times in carrying out their main tasks and functions, so that the quality of work will increase, especially in educating and in the learning process . As a educator must more creative in the learning process in accordance with technological development No will to disrupt educators , but help in a way practical in learning , improving efficiency learning as well as increase experience Study participant educate . Teachers who have skills ICT integration tends to to give experience learn more interesting and relevant for student .

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