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Supervisor in Era Industrial Revolution 4.0 and Society 5.0

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Abstract: The writing of this article aims to find out the role of educational supervision in the era of the Industrial Revolution 4.0 and Society 5.0. The writing of this article uses a literature study approach by examining theories that are relevant to the professionalism of teacher performance developed in accordance with technological progress, the role of supervisors in educational institutions, and IT-based supervision programs in the Industrial Revolution 4.0 era. The results showed that: (1) the role of supervisors in the supervision program can reconstruct the professionalism of teacher performance developed in accordance with technological advances; (2) supervision is able to create competitiveness of educational graduates in the current global market; and (3) IT-based supervision is developed to improve the professionalism and competence of teachers in improving the quality of national education.

Keywords: supervision, principal of school, industrial revolution 4.0 and society 5.0

I. INTRODUCTION

The activity of learning process is one of the efforts in realizing educational development in Indonesia, the learning process aims to improve the human resources (HR) which is owned by a nation especially as a step for the government to support today's young generation to be able to compete globally in all aspects of life, especially in education. Education is one of the most influential factors as a determinant of improving the quality of human resources, therefore the role of professional and competent educators was very supportive for the realization of the quality of education.

Another important component as the fundamental elements to increase the quantity and quality of learning in schools, there were have the role of a principal as a leader in education and school supervisors. The role of the principal as a driver of sustainability education program must have the power of intellectual skills and other support competence in leading an educational institution. The role of leadership in educational institutions seeks to build relationships for individuals as foundation values for the achievement of educational institutions.

According to Bush & Marine (2000) suggested that leadership was future-oriented (transformation leadership). Educational goals were achieved if a leader has the skills to encourage, direct, mobilize and influence others in the implementation of learning programs (Sulistyorini, 2008). Meanwhile, the school supervisor has a series of activities in preparing and implementing a monitoring program, evaluating the results of the program implementation and providing guidance and training to improve teacher professionalism in learning activities. Monitoring activities must be carried out in an academic and managerial manner so that the achievement of educational goals.

Thus, more effective, efficient and productive so that schools can run learning programs in a superior, modern and quality manner. Leadership will organize programs systematically to achieve the goals set. So that, leaders must have program planning, organizing, monitoring and evaluation to review the level of success of the program implemented to make it run well. Education in Indonesia has entered a new era (21st century education) caused by advances in technology, the world of education was currently faced with various challenges, of course, principals were required to be more sensitive in responding to various educational issues going forward. Innovative and visionary leadership is the foundation of strength in building and managing educational institutions with clear steps and strategies.

Industrial revolution (IR) 4.0 reflects changes in the worldview where information technology is the basis of human life, so that many jobs are currently carried out digitally. It could influence by the development of massive internet and digital technology as the backbone of movement and human and machine connectivity. Challenges for supervisors in improving the quality of education where education supervision services are based on technological and information developments. Supervision programs are implemented to improve the quality of education, so that the output of students can compete in the future workplace.

Nowadays, IR 4.0 presents a challenge for the development of education, where the role of teachers academically must view education globally. The use of technology in the supervision program was expected to be able to provide and improve teacher competence in 21st century education in improving the quality of education in schools so that the expected results more optimal. Teachers no longer be the main source of learning but rather acts as a facilitator for the students to get ready for the learning process is accelerated digital sophistication, teachers seek to collaborate on the quality of students with developments in science and technology.

Fisk (2015) explained that the era of IR 4.0 where teachers are able to conceptualize learning to students so that they have critical thinking, communication, collaboration, creativity, and innovation. The main focus

of education innovation 4.0 develops smart, portable, global and virtual learning skills in the future (Shahroom & Hussin, 2018). The challenge of IR 4.0 must be responded quickly by the relevant stakeholders. In order to be able to increase the competitiveness of the Indonesian people in the midst of global competition, all information becomes unlimited which makes disruption in human activities.

Supervisors must be prepared to face changes in the education sector, technological advances and information accompanied by the development of teacher professionalism in teaching through supervision programs in order to facilitate students to be more capable and skilled. The Concept of IR 4.0 is an industrial phase characterized by cyber and manufacturing digitalization, so that new forms of interaction between humans and machines occur where analysis was driven by computational power and technology connectivity (Lee, 2013; Hermann, et al., 2016; Irianto, 2017).

IR 4.0 fundamentally results in changes in the pattern of human life and competitiveness in the world of work with the quality of skilled human resources. Hermann, et al. (2016) classify the four principles of Industrial Revolution 4.0: (1) interconnection, (2) information transparency, (3) technical assistance, and (4) decentralized decisions. On the other hand, the revitalization of education becomes government policies in responding to these challenges and threats, support from the government must include: (1) learning systems, (2) educational units, (3) students, and (4) educators and education personnel.

In general, the disruption caused by the IR 4.0 has an impact on increasingly turbulent competition, uncertainty, complexity and ambiguity between fellow human beings. The industrial progress must degrade the role of humans against the sophistication of digital machine which caused numerous humans loses his job, to address these challenges Japan offers the concept of Society 5.0 in response to the problems arising from the development of IR 4.0.

The emergence of Society 5.0 seeks to balance the role of humans with the development of technology, information Big Data is analyzed and interconnected with the role of humans in various forms more effectively, so that humans were able to collaborate industrial technology and social activities in economic development to solve problems in parallel.

Maximum use of technology as an effort to obtain knowledge information through human and cyberspace connectivity to solve various community problems effectively and efficiently and create a better life for humans themselves. Concept society 5.0 aims to create a human-centered society, which is a combination between cyber and the real world to produce quality data as a value and solution to overcome the challenges of human life. Therefore, supervisors must be able to address this by opening up a broader view in supporting the professionalism of teacher performance in every supervision activity carried out, so that results that are expected to have a major impact on the quality of education in Indonesia.

II. METHOD

Writing this article aims to determine the role of school principals and school supervisors in overseeing education in the era of the Industrial Revolution 4.0 and Society 5.0. The writing of this article uses a literature study approach by examining theories that are relevant to the professionalism of teacher performance developed in accordance with technological progress, the role of supervisors in educational institutions, and IT-based supervision programs in the Industrial Revolution 4.0. This article is expected to be a reference for implementation supervision in educational institutions in improving the quality competencies of students' graduates and the quality of national education.

III. RESULTS

1. Teacher's Competence of Industrial Revolution Era 4.0 and Society 5.0

The development of technology contributes to the implementation of current educational programs. School principals, supervisors and teachers were required to have high competencies to deal with technological developments. Monitoring was expected to be able to facilitate teachers to broaden their knowledge horizons for learning developments and innovations that were currently entering the era Industrial Revolution 4.0 and Society 5.0. Technology as a tool for teachers to increase their space for maximum competence in learning.

Industrial Revolution 4.0 certainly brings significant changes in the education system in Indonesia, Teaching and Learning, Ethics and Digital Training and Professional Development are three important factors in the education supervision system (Izwah, 2018). The role of the teacher becomes an aspect that continues to be studied in order to be able to face the times, teachers are required to have competency skills to produce output of students towards the current era of globalization, reflecting the development of human skills by adopting continuous professional development. Teachers have complex tasks and challenges that are all competitive, the role of educators requires high professionalism. The quality of teachers in facing educational disruption in the era IR 4.0 by developing three aspects, namely digital literacy, technology literacy, and human literacy (Aoun, 2017). These aspects are needed to prepare students who are capable of innovative thinking in various forms of scientific disciplines. developing, education seeks to create competent human resources to use information and internet access optimally.

Schools become a medium to produce students who develop and character in accordance with their potential optimally, learning practices are carried out to build the quality of education so that teachers play a varied role in teaching. Entering the current era of disruption, teachers are able to develop their competencies in the form of IT-based education services in order to build teacher professionalism. Characteristics of teachers in the IR 4.0 are supported by creative and innovative power, pedagogical multiliterate, personality and professional competence, discipline, honest and confident. These various factors help educate students in facing educational disruption, disruption is used as an

opportunity for future innovation in improving the quality of education.

Education is a leading sector in human development that is globally competitive and changes in socio-economic conditions of the world community, because the progress of a nation is seen in the quality of education quality produced as the philosophy of the nation's goal of education strives to produce quality people, behave with good morals. IR 4.0 connects communication networks between humans and technological tools, teachers can access all of their needs with information on internet technology where the basics of information received are used as materials in updating learning innovations. Schools as social systems take a role to create competent generations who are ready with today's digital era.

Industrial Revolution 4.0 coloring the world of education in determining the quality of education, increasing the competence of teachers as the leading actor in the administration of education, the assumption is the competency of qualified teachers can make an education quality. It must also get support from the government and community participation for national education development. In educating the millennial generation in the current digital era, teachers are expected to not forget their role as educators, a change in the world that is so fast with various advances in educational technology can change the views of how to work and study students in the school environment. Teachers must be able to become actors of inspiration and role models for the development of students' character going forward, learning must be centered on students both in terms of academics and affective (character).

Disclosure of technological innovation should be owned by every educator, in fact, the technological progress of teaching process can be done without a teacher but as an educator, the role of the teacher is irreplaceable and will always be needed until whenever. There are four major challenges that must become a new paradigm for today's teaching staff, namely: (1) Industrial Revolution 4.0; (2) globalization; (3) the need for competitiveness and supply of labor, and (4) educating the generation of the digitalization era. In other words, the teacher must continually improve the ability to be able to educate today's millennial generation, if the teacher is not ready to face this changing situation, education in Indonesia will experience a lag from other nations, supervision provides provision for teachers to be able to change the way of educating and teaching and learning because education and learning in this digitalization era try to create a generation of students who are able to compete with the sophistication of machines. Besides that, the teacher must be able to instill character development values for students, especially in the wise use of information technology advances.

Qusthalani (2018) classifies five teacher competencies in Industrial Revolution 4.0, namely: (1) educational competence; internet-based learning competence; (2) competence for technological commercialization; teacher competency to support student entrepreneurship; (3) competence in globalization; teacher competency in solving problems of education globalization; (4) competence in future strategies; teacher competency in developing strategies to determine the right learning in the future; (5) counselor competence; teacher competence in dealing with psychological learners due to the times.

Wahyuni (2018) argues that the problems faced by teachers in the future will be increasingly complex where teachers must have technology-based skills qualifications, form work groups with the support of e-literacy to create a collaboration that is oriented towards the development of teacher intelligence. Changes in the world of education in the era of IR 4.0 make technology the basis of human life because it is influenced by the development of digital technology that connects movement and connectivity between humans and machines. IR 4.0 creates a mass generation of flexibility with a better level of productivity (Zhong, et al., 2017). However, on the contrary, Hariastuti, et al. (2017) stated that changes and advancements in information technology had an impact both positively and negatively on the continuity of human life later.

Supervisors and teachers must be responsible for preparing graduates who are competitive and able to compete globally, the learning system is equipped with data on information and technology that will be transformed to students to improve the quality of current human resources. Subekti, et al. (2018) propose literacy development strategies to prepare science teacher candidates in the face of IR 4.0 era, including: (1) information literacy, (2) research skills, (3) capability of prospective science teachers, and (4) integrated learning STEM (science, technology, engineering and mathematics). The teacher strives to instill a growth mindset for students in their learning process so that they are expected to be able to respond to each change and see an achievement in learning as an effort to learn.

Various challenges and opportunities faced by teachers encourage the development of teaching creativity to be better, but on the other hand the role of the government needs to review the relevance of education and technological advances in order to continue to pay attention in terms of humanitarian aspects. Improving the quality of education in Indonesia is based on the application of appropriate humanistic values, education transforms students in achieving self-actualization by understanding the environment and itself (Arifin, 2018).

The humanistic foundation promotes meaningful learning for students, learning is interpreted as preparation for facing situations and conditions that continue to change. This is in line with the emergence of Society 5.0 by applying the values contained in society to be able to solve various challenges and social problems by utilizing various innovations born in the era of IR 4.0. Therefore, teachers must develop the concept of knowledge with the development of technology, the sophistication of technology can now transfer various data without the need to connect with humans, but to avoid the turmoil that arises from the development process in the presence of society 5.0 intends to combine advanced technology in various industries and activities social and encourage innovation to create new values. The role of supervisors in supervising all series of process activities in the school

environment must respond to these problems comprehensively, maximum service in structured supervision opens the teacher's mindset to take opportunities for learning innovations from the technological sophistication that develops in the world of education. Teachers will act professionally if there is guidance and assistance from supervisors in overcoming educational problems while carrying out their duties in school, supervision plays an important role in implementing teacher activities to improve their ability to improve the quality of national education.

2. The Role of Principals and School Supervisors as Supervisors

Principals and school supervisors have the authority and responsibility for the success of a school education program, the problems that occur in the scope of the school become a major threat to the success of the teaching and learning process, the supervisor's task must be able to read the situation and evaluate it to overcome the problems it faces , in improving the goals to be achieved, supervision needs to be directed towards developing teacher performance in the learning process, providing assistance to teachers and emphasizing certain aspects to support the supervision program.

Daryanto (2011) defines the principal as the leader of an educational institution that is directly chosen and determined by the government. In line with this opinion, Wahjosumidjo (2002) argues that the principal as a functional person to lead a school so that the interaction between the teacher and students occurs in the learning process. Based on some of these opinions, in broad outline it can be concluded that the principal is a leader who has the ability to maximize the resources available in a school so that implementation and learning activities are carried out more effectively and efficiently and work together to achieve the goals of education and learning.

A school supervisor in supervising the implementation of a learning program in an educational institution must have competency in continuous professional development to be able to direct the school towards the national education goals that have been set. According to Sudjana, et al. (2011) defines school supervisors as one of the educators and education staff who plays an important and strategic role in increasing the professionalism of teacher performance and also the quality of education in schools. Leaders are required to be able to arouse the feelings and willingness of teachers without fear of work (Arimbi, 2011). Two main objectives in the supervision program where the main activities are directed at educational technical and administrative technical activities (Ministry of Religion, 2004).

Supervision must be objective and continuous so that the activity is right to solve the problems faced by the teacher, Wahjosumidjo (1994) classifies the objective nature of supervision, namely: (1) avoiding the act of being forced (acting hard) to the teacher; (2) must be able to perform actions that give birth to the willingness to work with enthusiasm and confidence in the teacher. Furthermore, Sutisna (in Kompri, 2017) presents several characteristics of an effective supervision program, namely: (1) Supervision adjusts to the nature and needs of the teacher; (2) Supervision is carried out to find out the facts of the problems faced by the teacher; (3) Supervision is directed at improvement programs, flexible, and preventive (eliminating the possibility of occurrence of an unwanted event in the future); (4) The supervision system must be understood. Besides that, research of Thannimalai & Raman (2018) shows that there is a significant relationship between Principal Technology Leadership and Teacher Technology integration in the classroom.

The role of a good supervisor will show trust and support for the school community to achieve the goals of the educational institution. Therefore, the supervision activity is an effort in overcoming the problems of teachers in the field. If the principal has a concept of understanding supervision that is good then the supervision carried out by the principal will be more effective and efficient, supervision carried out as a whole is an integral part of the process of educational activities, without structured supervision can lead to weaknesses that hinder learners' learning. Another situation that arises is not achieving the predetermined learning goals, intellectual skills possessed by supervisors in supervision activities as an effort to improve the quality of education.

3. Principal and School Supervisor: Supervision Based on Technology

The progress of Information and Communication Technology (ICT) greatly influences the development of the world of education in Indonesia, teachers must always be trained to use technology as a source of learning. The use of technological sophistication in learning to create a fun learning and teaching situation so that students participate in learning materials run more optimally. As the 2010-2014 Ministry of National Education's Vision that the use of ICT is a strategic policy to support the implementation of excellent national education services to form a comprehensive intelligent Indonesian person.

Suriansyah (2015) suggested several attitudes that must be prioritized in implementing IT-based learning, namely: (1) improving school infrastructure, (2) improving human resources and learning resources for teachers, and (3) improving the competency of school principals or school supervisors. With other meanings that supervision activities must be able to open space for learning creativity by using technological advances. IT-based supervision serves as a tool for supervisors to process data information obtained in conducting surveillance techniques.

The supervision program is able to improve teacher professional competence, through these activities help supervisors map problems in learning practices, find solutions, plan learning, carry out learning, and evaluate the process and learning outcomes. Supervision programs will run well if learning in schools also goes well, besides that it must also be supported by competency capabilities of all elements of the education implementation in the school. The role of supervisors in education supervision is carried out continuously and structured so that problem solving can be done appropriately.

Renewal in the education system concerns each component of education, schools must be able to adjust to the paradigm shift in the world of education. Likewise, in terms of supervision must also be adjusted to current technological advances in order to facilitate supervisors in mapping problems, implementing and evaluating to follow up on teacher problems. in the field. Supervision is carried out to identify teacher weaknesses in carrying out their duties, so as to provide opportunities for teachers to improve professional competence. In general supervision activities still use conventional methods, with the development of Industrial Revolution 4.0 supervisors are expected to carry out their duties using a supervision-based approach IT.

The technology that can be utilized by supervisors is the internet network source, through virtual supervision activities. This virtual supervision model is intended to monitor the activities of teachers being processed without any limitations on time, place and distance (Zarkasi, 2018). Conventional supervision methods are still considered to have many obstacles to the problem of the time of service provided by the principal and school supervisor, virtual supervision provides access for teachers to convey inputs that are directly related to the learning process, through discussion expected to be able to solve teacher problems based on results the results of the study to improve the quality of education in schools. The results of another study by Rugaiyah (2016) suggested a clinical supervision model that school supervisors developed from Glickman's theory, including:

1. Preparation phase (pre-observation): establish the time of supervision and preparation of the learning plan via SMS, email or via telephone.
2. Observation stage, independent analysis phase: supervision using video recording.
3. Collaborative analysis phase: using video recordings and clinical supervision instruments, including;
   a. research and information collecting: conduct a literature review related to clinical supervision to improve teacher competence.
   b. planning; gathering information about teacher understanding of the learning process through interviews.
   c. develop preliminary form of product; preparation of clinical supervision guidelines, such as video recording guidelines during the learning process.
   d. preliminary field testing; consult with the expert team and test the use of clinical supervision guidelines.
   e. main product revision; revise the clinical supervision guide.
   f. playing field testing; retest the revision of the clinical supervision guide.
   g. operational product revision; make revisions after the activity of using a clinical supervision guide by a team of experts.
   h. operational field testing; carry out validation tests with the number of samples through interviews, observations, questionnaires and then the data is analyzed.
   i. final product revision; make the final revision as a whole after the implementation of clinical supervision activities in the field.
   j. dissemination and implementation; submit reports on the implementation of activities in a research seminar and scientific journal.
4. Conference and feedback stages: supervisors must meet directly with the teacher to discuss the results of independent assessment analysis and collaborative analysis.

A series of supervision activities is all stages carried out by utilizing the sophistication of information and technology, except at the conference stage where at that stage the supervisor must meet face to face directly with the teachers so that a harmonious relationship between each other is created. The implementation of technology has become a new source of reference for education so that it can adapt to the development of the era of IR 4.0 and the present-day Society 5.0, in order to accelerate in order to improve the quality of national education comprehensively.

The results of the evaluation are directed at improving the problems found (Azhari, 2004). The main activities of the supervision program in schools to measure the success of learning activities are able to improve the achievement of learning objectives more efficiently and effectively. The programming of supervision by using technological sophistication is a challenge for the role of supervisors in the future to face students in the current digitalization era. Effective supervision programs aim to increase the professionalism of teacher performance and maximize graduates in order to be able to answer the changes in globalization in the era of Industrial Revolution 4.0 and make society smarter as reflected in the concept of Society 5.0.

IV. CONCLUSIONS

Based on the results of research that supervision is an important element in supporting school learning programs, facing the disruption of education in the Industrial Revolution 4.0 and society 5.0, the supervisor's role is oriented in the future, supervision is carried out to improve pedagogical multi-literacy teachers in order to improve the quality of students. Supervision of the education system seeks to develop educator professionals and learning innovations, the supervision system using technology seeks to develop teacher competencies in facing the challenges of the times.

There are four major challenges that must become a new paradigm for today's teaching staff, namely: (1) Industrial Revolution 4.0; (2) globalization; (3) the need for competitiveness and supply of labor, and (4) educating the generation of the digitalization era. The teacher seeks to instill a growth mindset for students in the learning process so that they are expected to be able to respond to each change and see an achievement in learning as a learning outcome. Disruption of education changes the paradigm of the education system in Indonesia due to technological developments, especially in the field of education, schools must be prepared to equip these changes in order to produce quality competent education.

School principals and school supervisors must have good innovation and competency skills to support

the realization of educational programs, but in a comprehensive manner it is a shared responsibility between relevant stakeholders, schools, parents and community participation to support the education revolution in Indonesia. The characteristics of the supervision program by adjusting to the nature and needs of the teacher, based on facts in the field and directed to improvement programs to be more optimal. IT-based supervision serves as a tool for supervisors to process the data information obtained in conducting surveillance techniques, IT-based supervision in the learning process to improve school infrastructure, increase human resources and learning resources for teachers, increase the competency of school principals or school supervisors.

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