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## Scientific study on digitalization of educational supervision services

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### Abstract

This essay is an effort to empower the academic or educational supervision in Revolution 4.0 era and COVID-19 pandemic. Both are the parts and undeniable issues in the life of people, include educational supervision. For these reasons, it is a need and an urgency to perform and to apply the digital-supervision, thinking that it is compatible with the modern time. This writing has objectives to recognize, analyze, and describe the implementation of virtual/digital academic supervision. The data collection in this scientific article uses the literature study method or literature study by reviewing journals that are relevant to the topic of discussion. The results obtained from this writing of this scientific article indicate that in the era of Relution 4.0 Information and Communication Technology (ICT) has now entered the world of education, including the implementation of supervision. Digital academic supervision (E-Supervision) that going online by utilizing existing technology is a new breakthrough as well as a form of solving problems or solution for an effective and efficient supervision faced by current situation. The implementation of digital academic supervision (E-Supervision) is considered to enhance competency and capability supervisor, principal, teacher to play the role as professional educator and skill in technology. At the same time, virtual/digital academic supervision bring the related challenges that needed equipments and prepared persons in using technology.

**Keywords:** Revolution 4.0, supervision, digitalisation

### Introduction

In the Regulation of the Minister of National Education (Permendiknas) number 41 of 2007 concerning Process Standards for Primary and Secondary Education Units, section V.B, it is stated that supervision is part of the supervision of the learning process.

### The quote is as follows

- Supervision of the learning process is carried out at the planning, implementation and assessment stages of learning outcomes
- Learning supervision is carried out by providing examples, discussions, training and consultations
- Supervision activities are carried out by school principals and education unit supervisors.

It became clear that according to the regulations, supervision was part of the education and learning process, and not as an addition or a complement.

Today education and learning activities are carried out in 2 situations that cover all aspects of life, namely: the Industrial Revolution 4.0 and the COVID-19 Pandemic.

In such a context, the need for digitalization in education, especially in supervision activities, becomes an appropriate choice and need. This paper is an effort to empower supervision so that it is in accordance with the times (Industrial Revolution 4.0) and simultaneously despite facing the COVID-19 Pandemic.

The Industrial Revolution 4.0 is a comprehensive transformation that covers all aspects of production from industry through the fusion of digital and internet technology with conventional industries. Or, the Industrial Revolution 4.0 is prioritizing the element of speed in which information is available, where all industrial environmental entities are always connected and can share information with each other (Schlechtendahl *et al.*, 2015) <sup>[12]</sup>.

Another opinion: The Industrial Revolution 4.0 is the integration of Cyber Physical System (CPS) and Internet of Things (IoT) and Internet of Services (IoS) into industrial processes that include manufacturing, logistics and other processes (Kagermann *et al.*, 2013) [2]. The Industrial Revolution 1.0 began in 1776, with the invention of the steam engine by James Watt (1736-1819) which used wood and coal as fuel. This steam engine is very efficient because it can move ships for 24 hours. Since the discovery of this machine, European countries began to invade and expand their power to the region of Asia and Africa. Another impact is the spread of massive industrial products.

The Industrial Revolution 2.0 occurred in the early 20th century with the discovery of electricity by Thomas Alfa Edison (1847-1931). This invention (electric power) replaced the use of human and animal muscles and steam engines. The Industrial Revolution 3.0 occurred around 1989, where computers began to appear, so industrial and manufacturing automation developed. The role of humans began to be replaced by machines in the form of computers and robots.

The Industrial Revolution 4.0 emerged when manufacturing activities were integrated through the massive use of wireless and big data technology, which made data utilization more efficient with server systems, integrating all automation activities in one system. This is the era of cyber technology that began in the 2000s. The Industrial Revolution 4.0 is closely related to the term Digital Transformation, namely the changes caused as a result of the application of digital technology in all aspects of human life.

The COVID-19 pandemic is the event of the spread of the corona virus disease in 2019 (Corona Virus Disease 2019, abbreviated as COVID-19) throughout the world. This disease is caused by a new type of corona virus called SARS-CoV-2. The COVID-19 outbreak was first detected in Wuhan City, Hubei, China on December 31 2019, and was declared a pandemic by the World Health Organization (WHO) on December March 11, 2020. According to data released by WHO until October 24, 2022, there were 624,235,272 people who were confirmed to have been exposed to the virus, and there were 6,555,270 people who had died from this virus of all the efforts that have been campaigned by various parties to prevent, reduce and stop the spread of the corona virus, there are two things that are appropriate to mention in connection with the main theme of this article's discussion, namely: implementing Physical Distancing and Work From Home.

## Discussion of Theoretical Studies

### Educational supervision study

Definition of Educational Supervision.

From several sources, several definitions and descriptions of supervision have been found, including:

- Activities to foster educators in developing the learning process, including all its supporting elements (Pidarta, 2009: 2) [6].
- A peer-to-peer professional assistance carried out through dialogue on educational problem studies to find solutions to improve the professional abilities of school principals, teachers and other school staff in order to enhance school performance towards achieving quality education (Sudjana, 2011: 5) [13].
- Coaching activities that are more directed at efforts to improve and/or enhance the professional abilities of teachers (Muslim, 2010: 41) [3].

- Assistance and services provided to teachers so they want to continue learning, want to improve the quality of learning and want to foster creativity. In supervision, cooperation occurs to improve teaching materials, teaching models/methods and teaching evaluation, by selecting and revising educational objectives. Thus supervision is made to improve the quality of learning, education and curriculum so that better results are achieved (Sagala, 2012: 94) [9].
- Academic supervision includes the attention of students who are busy learning, the teacher's performance in explaining the subject matter, the teacher's skills in using visual aids, the teacher's thoroughness in assessing student learning outcomes in class or correcting test work (Arikunto, 2004: 33) [1].

The descriptions above can be synthesized that supervision is a real activity carried out by a supervisor in a systematic, objective and disciplined manner and consistently in fostering, guiding and providing assistance to teachers to solve obstacles that are being faced and improve the quality of learning and the professionalism of teachers. The results of this supervision can be seen from changes in learning activities and student learning outcomes.

### Basic Concepts of Academic Supervision

One theory that supports the development of human resources, and is considered to have relevance to the need for supervision in the field of education, is the theory of human capital. Permadi (2010: 30) [5] explains that the theory of human capital is a school of thought that considers that human resources are considered as capital goods that can determine the achievement of profits and productivity as other forms of capital. Permadi (2010: 30-31) [5] suggests that in the sociology of education, this theory of human capital can be equated with what is called the theory of technological functionalism. Both emphasize the technical dimension of education and the efficient use of human resources. Both theories have the same mission, namely eradicating various obstacles that result in the weak role of education in growth and development. Sagala (2013: 212) [9] states that education should not be interpreted as a 'consumption', but must be interpreted as a productive 'investment'. It was further explained that educational development is part of human capital, namely daily work related to a number of materials managed by humans and forms of models that are felt to produce something useful. Human resource development includes training, career development, performance management and development, coaching, succession planning, employee identification and organizational development.

It becomes clear that human resources are an important investment in the development of the world of education. As an investment in education, human resources need to be improved. This capacity improvement can be achieved in various ways. One of these ways is through the supervision process. Basically, supervision in the field of education is an activity carried out for the development of human resources for education actors or teachers. The management is carried out to utilize human resources so that they have an integrated and coordinated attitude (personality) to achieve the goals of the school organization. This management can be carried out by principals and school supervisors with their authority as supervisors through decisions determined

by directing resources to achieve goals in the context of knowledge (knowledge), developing abilities/skills (skill development) and attitudes or changing attitudes (attitude change).

Educational supervision always refers to activities to improve the learning process. The quality of learning is strongly influenced by the professional quality of teacher performance. So efforts to improve the professional ability of teachers in carrying out the learning and teaching process can be done through the assistance of continuous supervision. This professional capacity improvement is more successful if it is carried out by teachers with their own will and efforts. However, teachers often still need the help of others, because they do not know or do not understand the types, procedures and mechanisms for obtaining various resources that are indispensable in an effort to improve their professional abilities. The assistance needed by teachers in improving their performance and professionalism is in the form of supervision. In learning activities, supervision is seen as an art of collaboration with a group of teachers in order to obtain optimal and useful results in the world of education, especially in learning process activities. The art of cooperation in learning supervision activities requires the ability to practice the principles of good human relations (Sagala, 2012: 87) <sup>[9]</sup>.

### Education Supervision Model

Supervision has several models with unique characters. Supervision model is a form or conceptual framework or pattern of supervision that is used as a guide or reference in supervision activities. Some of these supervision models, namely:

- Conventional model, namely the supervision model which adheres to the notion that the supervisor is someone who has the power to determine the fate of teachers. Usually supervisors with a conventional style will find fault with the teacher and often spy on the teacher.
- Artistic Model, namely the supervision model which requires supervisors to have knowledge, skills, and not be rigid and therefore have artistic value (art). Sergiovanni (1982: 66) mentions that there are eight characteristics of this supervision model, including: (1) requiring attention to listen more than speaking, (2) requiring a sufficient level of knowledge, (3) prioritizing the unique contributions of teachers, (4) demands to pay more attention to the learning process in class, (5) requires a language skill in how to express what is owned by others which can make other people clearly capture the characteristics of the expressions expressed, (6) requires the ability to interpret the meaning of the events disclosed, (7) create a relationship of dialogue and mutual trust between supervisors and teachers, (8) accept the reality of personal supervisors who have strengths, weaknesses, and experience in their abilities.
- Scientific Model, namely the supervision model used by supervisors to collect data or information and assess the work of school principals and teachers by using observation sheets.
- Clinical Model, namely a form of supervision that is focused on improving teaching through a systematic cycle, in intensive and careful planning, observation and analysis of real teaching performance, and aims to

make changes in a rational way (Sahertian, 2008: 33-44).

### Digital academic supervision study

The Era of Revolution 4.0 is an era of technological achievements and advancements which have an impact on the right supervision model to be implemented. Technology makes jobs easier, communications are getting more intense in quantity and quality and fast distance coverage. At the same time, the COVID-19 pandemic requires people to (one of them) keep their distance, reduce close interactions with other people so that the virus does not spread further and is not exposed to it. The COVID-19 pandemic seems to emphasize that the Revolution 4.0 inevitably has to be lived. So it's like there's a blessing in disguise. That is, in an unfavorable situation (there is a disease/virus), a new or appropriate way to carry out supervision activities emerges (Revolution 4.0).

Supervision before the 4.0 Revolution and before the COVID-19 Pandemic was carried out on the spot. That is, the school principal and/or education supervisor visits the school and then carries out supervision. Supervision of this model is easy to implement in certain places, for example, close proximity, qualified facilities, sufficient human resources, affordable costs. However, in certain areas, for example the 3T Regions (Front, Remote, Disadvantaged), certain problems arise, including: (1) lack of visits by school supervisors due to geographical constraints and limited transportation facilities, (2) limited operational funds limited, (3) limited number of supervisors. As a result, supervision activities are carried out unevenly. The COVID-19 pandemic has added to the problems and difficulties in implementing on the spot supervision for schools, especially those in remote areas. As a consequence, the development of equitable education is increasingly hampered. Therefore, there is an urgency to optimize technology in the field of supervision. Digitalization of Educational Supervision is the process of using technological facilities in supervision activities.

### Digital supervision model

Just like conventional supervision (on the spot), digital supervision also follows the following stages:

- Principals and/supervisors conduct interviews with teachers.
- Supervision of the learning process from beginning to end.
- Principals/supervisors as supervisors prepare materials or assessment instruments and special programs to provide academic supervision guidance to teachers and other staff for improvement and development.

However, the digital supervision process is carried out online. This means that the principal and/or supervisor and teacher are in their respective places, without having to have a face-to-face meeting. Supervisors can monitor at and from anywhere and anytime without limitations on distance, time and place.

### Specifically, the stages of digital supervision are as follows

- Supervised educators send RPS, Syllabus, and other files to supervisors via Google Doc, WhatsApp Doc, Email, and others.

- Supervisor asks educators to fill in the supervision instrument via Google Form.
- Supervision is carried out through various digital platforms in accordance with those used by educators in the learning process (e.g. Video Conference links).
- Supervisors analyse the results of observations to be discussed with educators after learning.
- The results of these observations are sent by the supervisor using the E-mail platform, WhatsApp, and others.

The Ministry of Education and Culture (2020) issued a School Superintendent Performance Guide during a pandemic. There are listed applications that can be used by school supervisors in carrying out coaching and individual assistance to school leaders or educators: SMS, Telephone, WhatsApp Call/Video, Google Forms, Microsoft Teams, Zoom, Google Meet, Webex. Meanwhile, for group assistance, software can be used, including: WhatsApp (video call 8 people), Microsoft Teams, Google Form, Zoom, Google Meet, Webex.

Based on the challenges of implementing digital academic supervision in the 3T area, there are several approaches used to facilitate the supervision process, as explained in research (Rowe, *et al.*, 2016)<sup>[7]</sup> that approaches that can be used or further investigated to facilitate supervision include: Solar power, optical fiber or satellite expansion, drones, Jardiknas (National Education Network), long and short radio waves, and the Internet.

#### Benefits of digital supervision

- Digital academic supervision techniques are considered effective and efficient because they can be accessed by up to dozens of people and can be optimized by supervisors to supervise several people from different educational units at one time.
- Virtual or digital academic supervision provides more flexibility for supervised teachers to convey thoughts or ideas related to teaching problems in class, the atmosphere during virtual supervision is also not as tense as during conventional academic supervision, because the implementation must be face to face exclusively with supervisors .
- Electronic or digital supervision (E-Supervision) is the latest breakthrough from manual or conventional academic supervision models to digital-based academic supervision by utilizing Information and Communication Technology in the era of the industrial revolution 4.0 (Zarkasi, 2018)<sup>[14]</sup>. Therefore, digital or electronic academic supervision (E-Supervision) is very effective and efficient as an answer to the challenges of Revolution 4.0, and especially during the co-19 pandemic.
- The monitoring process becomes easier and the results obtained are faster and more automatic. This model makes it easier for supervisors to carry out supervision and is not based on geographical location, can improve the quality of teacher learning and teacher competence in the field of technology, and can improve the quality of educational institutions.

#### Digital academic supervision challenge

Digital academic supervision does not always benefit supervisors and teachers. As explained in the study (Rowe *et al.*, 2016)<sup>[7]</sup> explains that in the Special Region (3T) to communicate usually requires the use of an SSB radio or

physical communication actions such as walking or riding a motorcycle to find a telephone signal, besides that it can also be go to the Office at the District or District Center. Internet access via dial-up or satellite is also very limited and expensive. Meanwhile, the implementation of E-Supervision requires electricity from various sources, cellphones that use various 3G, 4G satellites, and other variations. In line with the research results (Rupiah, 2021)<sup>[8]</sup> explains that the implementation of academic supervision by utilizing ICT also faces several obstacles, namely: poor signal, lack of mastery of technology, frequent power outages in remote areas, lack of internet quota, and increasing credit costs. Lack of understanding about the use of IT by teachers and supervisors, as well as limited adequate infrastructure due to limited funds from schools, especially private institutions, this is also an obstacle to holding digital academic supervision. Therefore, the implementation of digital academic supervision does not always provide advantages for current supervisors and teachers, but there are also deficiencies that are felt, especially in the 3T areas.

#### Conclusion

1. Digital or electronic academic supervision (E-Supervision) is a new breakthrough during the COVID-19 pandemic as an effort to implement the use of technology. The challenges of the industrial revolution 4.0 and the current COVID-19 pandemic can be faced with the implementation of digital academic supervision, which is considered very effective and efficient to be implemented by supervisors in coaching educators so that they can produce educators who are professional and IT literate.
2. The implementation of digital academic supervision is not always said to be successful, because there are several weaknesses, including: 1) The principal or supervisor or teacher does not master the use of technology, 2) The need for facilities and infrastructure such as electricity, internet network, computers is inadequate, especially in special areas 3T.
3. The implementation of academic supervision before the COVID-19 pandemic used conventional methods, where in the implementation procedure supervisors were required to come to the target schools to supervise teaching staff and had to make schedules related to class visits and class observations. After entering the era of the industrial revolution 4.0 and with the current COVID-19 pandemic, the role of technology is very important to be implemented in academic supervision activities which have been halted. Changing conventional academic supervision methods to digital-based academic supervision is considered effective and efficient in implementing academic supervision.

#### Suggestion

For District or Provincial Education Office Institutions: conduct training for teachers, school principals, education staff, supervisors in the field of using digital technology so they are not IT literate in the era of the industrial revolution 4.0. For school principals: motivating teachers to always be enthusiastic in carrying out their duties and obligations to create successful learning. For educators: to be role models and role models for students in implementing technology so that students can understand and get used to using technology today.

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