

# Digital Supervision and Team Work of Science Education at Vocational School

Saut Purba<sup>1</sup>, Abdul Hasan<sup>2</sup>, Keysar Panjaitan<sup>2</sup>, Binsar Maruli<sup>2</sup>

<sup>1</sup>Administrative Study Program, Postgraduate, Universitas Negeri Medan, Indonesia.

<sup>2</sup>Mechanical Engineering Programme Faculty of Engineering, Universitas Negeri Medan, Indonesia.

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Corresponding Author:

Saut Purba

[sautpurba@gmail.com](mailto:sautpurba@gmail.com)

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**Abstract:** The advances of information technology affect the variety of learning materials. This reality must be responded by developing learning model and also supervision system. The supervision and team work at science education also can be coordinated with the development of technology, especially technology based on handheld devices such as such as phones and tablets. This research aims to describe and determine: The influence of academic supervision on teamwork; The Effect of Academic Supervision on Teacher Job Satisfaction; The Effect of Teamwork on Job Satisfaction of State Vocational School Teachers in Medan City. The research method used is a quantitative method with a survey approach. The number of respondents was 198 people taken using Proportional Random Sampling techniques. The research instrument is a questionnaire, which is first tested to obtain a valid and reliable instrument. The result of this research shown that the digital supervision can be make the system more and more efficiently. This context of research academic Supervision has a direct positive effect on Teamwork of State Vocational Teachers in Medan City. In other words, the better the Academic Supervision, the better the Teamwork of State Vocational Teachers in Medan City, Academic Supervision has a direct positive effect on the Job Satisfaction of teachers of public vocational schools in Medan City. In other words, the better the Academic Supervision, the higher the Job Satisfaction of State Vocational Teachers.

**Keywords:** Digital Supervision; Science Education; Team Work

## Introduction

In recent years, the popularity and predominance of the digital technologies has accelerated and continues to grow exponentially. The digital wave is becoming increasingly associated with everyday life (Elliott, 2019) from schooling and education, to political engagement and even financial and health management. Moreover, the developments in digital technology, and the speed at which the technology emerges, drive innovation (Ciarli et al., 2021) and new applications that touch our lives in different and often profound ways (Sigov et al., 2022). While there are numerous opportunities and aspirations associated with digitalization, there is also a crucial need

to understand and mitigate the challenges it presents to society (Ismail, 2018).

The development of technology contributes to the implementation of current educational programs (Miranda et al., 2021; Sima et al., 2020). 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 (Lantada, 2020). Technology as a tool for teachers to increase their space for maximum competence in learning (Olofsson et al., 2020; Rachmat Satria et al., 2019).

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Modern technologies represented in the internet, computers, smart devices (Dankan Gowda et al., 2020; Khan et al., 2020), and other technological means are one of the most successful media that provide an integrated and attractive educational environment at the same time (Goldin et al., 2022). Furthermore, they enable to connect people of all ages and businesses at anytime and anywhere with minimal effort, time and cost. Relying on these modern technologies makes a remarkable development in the school environment by working to promote them in all its components and elements to achieve its goals and objectives (Selem, 2021).



Figure 1. Supervision Concept Icon Vector (Source: <https://www.vectorstock.com>)

**Method**

This study uses the literature review method and quantitative empirical research using the survey method. Literature searches are carried out to get the theoretical picture needed to strengthen understanding in parsing the problem. Furthermore, this research was conducted using quantitative methods. The model used is the path analysis model or often referred to as the causal relationship pattern. Path analysis is used to analyse the pattern of relationships between variables with the aim of knowing the direct or indirect effect of a set of causal variables (exogenous variables) on a set of effect variables (endogenous variables).

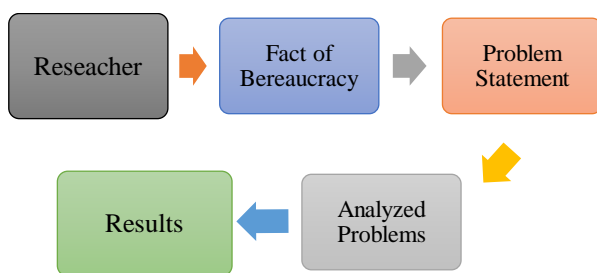


Figure 2. Research Flow Logic

The Systematic Literature Review (SLR) method was used to answer this research question. SLR is the

process of compiling, evaluating, and synthesizing all relevant research related to a particular topic, in this case digital visual marketing. The purpose of SLR is to provide a comprehensive overview of digital visual marketing research and identify gaps that require further research (Xiao & Watson, 2019).

Applies artificial intelligence technology to supervision methods and means, and improves the degree of supervision automation and intelligence (Aguilar et al., 2021; Hu, 2020). In this section of the article, we review some of the research in areas which are closely related to the topic of this article and need to be tied in more closely (Stone et al., 2020).

**Result and Discussion**

*Digital Supervision Architecture*

The internet crosses borders and countries. Increasingly, global think tanks are considering the privacy implications. Frau-Meigs and Hibbard, in a 2016 paper for the Global Commission on Internet Governance (GCIC), argue that internet governance in education is needed because children and youth are using the internet for everyday life and they need protection to build healthy, positive relationships with respect to internet use. They emphasize that children have the right to privacy, security, and dignity when online. Children also have the right to be forgotten, meaning that there should be mechanisms to remove online traces of children. Frau-Meigs and Hibbard encourage more corporate social responsibility from service providers leading them to include provisions to ensure children’s safety when they access the internet and when it is used for educational purposes (Robertson & Corrigan, 2015).

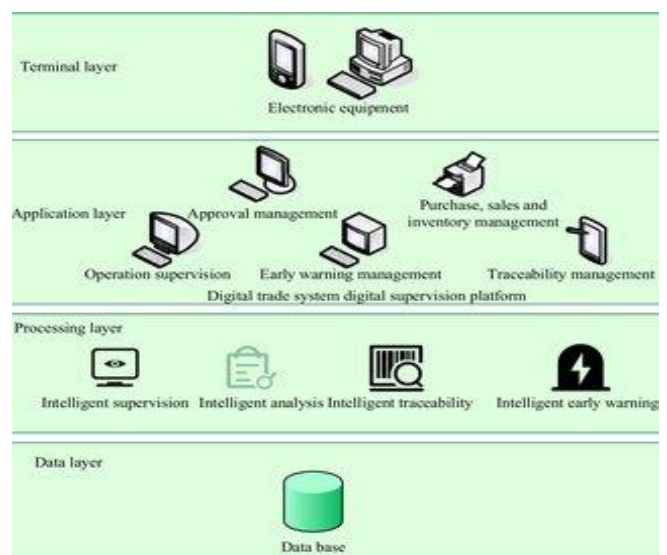


Figure 3. Construction of a Digital Supervision (Source: <https://www.google.com>)

An application generally has usability so that it is easy to use, learn, and function properly and can attract users to use the application (Schmidt & Tang, 2020). The international standard ISO 9241-11 defines usability as the extent to which the product can be used by users to achieve the targets that have been set with effectiveness, efficiency and satisfaction. In designing the user interface (Syahril et al., 2023). Modern technologies represented in the internet, computers, smart devices, and other technological means are one of the most successful media that provide an integrated and attractive educational environment at the same time (Karim et al., 2020). Furthermore, they enable to connect people of all ages and businesses at anytime and anywhere with minimal effort, time and cost. Relying on these modern technologies makes a remarkable development in the school environment by working to promote them in all its components and elements to achieve its goals and objectives (Zhang et al., 2020).

There are several stages that must be done, such as the four main stages, namely empathize, define, ideate, and prototype. In the empathize stage, designers must understand the needs and problems faced by users in learning digital marketing. In the define stage, designers must identify the most pressing problems that need to be addressed in the user's learning experience. In the ideate stage, designers generate ideas to solve the identified problems. Finally, at the prototype stage, designers create a prototype of the resulting digital marketing learning platform, and test its functionality with users. By using the Design Thinking method in designing an application generally has usability so that it is easy to use, learn, and function properly and can attract users to use the application. The international standard ISO 9241-11 defines usability as the extent to which the product can be used by users to achieve the targets that have been set with effectiveness, efficiency and satisfaction (Syahril et al., 2023).

The Digital supervision service help increase the quality of life and feeling of safety for elderly living at home, or in an institution, as they know they are under close supervision, and if anything should happen, they will get the attention they need within seconds (Sugiarto & Farid, 2023). Digital supervision in combination with a digital safety alarm and other sensors improve the quality of the service (Ammar et al., 2022). It does also offer benefits such as increased productivity, not to mention the opportunity to do quality supervision from a distance (Wilson-DeWitt, 2019). The technology that can be utilized by supervisors is the internet network source, through virtual supervision activities (Villarreal-Davis et al., 2021). This virtual supervision model is intended to monitor the activities of teachers being processed without any limitations on time, place and

distance. 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 (Rachmat Satria et al., 2019). Good counselors will always improve their competencies so that they are able to provide good guidance and counseling services (Hadi et al., 2023).

The electronic supervision is "a model based on the proper integration of technology, to replace traditional supervision (Abdella et al., 2020), using several methods, including: e-mails, discussion boards, forums, phone calls, and chat rooms that take place synchronously or asynchronously, through three basic elements that include users, infrastructure, Methods and methods". Electronic supervision concepts mean practicing supervisory styles that depend on modern communication techniques to support social workers (Salem, 2021).

#### *The Analysis of Supervisory System*

The respect to online supervision, research is not clear on who has the responsibility to teach and reinforce internet safety guidelines to protect students' privacy (Robertson & Corrigan, 2015). Currently online supervision can be said as a new supervision technique in West Sumatra. The benefits and facilities available are one of the reasons for online supervision. One form of online supervision is the Web. The web-assisted academic supervision model is developed to overcome several challenges in the implementation of academic supervision such as the large number of assisted teachers and distant geographical location (Habibi et al., 2020).

Principals and school supervisors have the authority and responsibility for the success of a school education program (Komalasari et al., 2020), 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.

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 (2019), 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. Two main objectives in the supervision program where the main activities are directed at educational technical and administrative technical activities.

Based on the data that has been collected, it is then analyzed with descriptive statistics by calculating the central tendency value and the size of the spread. This is done to find out the general description of the meaning contained in the distribution of the data obtained. The data description includes measures of central tendency, such as the mean, the average score of the middle two data (median), the score that has the most frequency (mode), measures of dispersion tendency, such as standard deviation, variance, range, lowest score (minimum), highest score (maximum), lowest ideal score (minimum ideal), highest ideal score (maximum ideal), ideal mean score (mean ideal), ideal standard deviation (standard deviation ideal), and frequency distribution.

#### *The Effect of Academic Supervision on Teamwork*

Based on the results of hypothesis testing, Academic Supervision has a direct effect on Teamwork, namely:  $\rho_{21}$  of 0.409 and based on the calculation results, the proportional direct effect of Academic Supervision on Teamwork is 0.167. So, Academic Supervision has a positive direct effect on Teamwork, in which 16.7% of changes in Teamwork can be determined by Academic Supervision.

#### *The Effect of Academic Supervision on Job Satisfaction*

Based on the results of the calculation of the proportional direct effect of Academic Supervision on Teamwork of 0.199. Based on the results of hypothesis testing, a significant path coefficient is obtained between Academic Supervision and Job Satisfaction, namely:  $\rho_{41}$  is 0.335.

#### *The Effect of Teamwork on Job Satisfaction*

Based on the results of testing the fourth hypothesis, a significant path coefficient is obtained between Teamwork and Job Satisfaction, namely  $\rho_{42}$  of 0.224. Furthermore, based on the results of the calculation of the proportional effect of Teamwork on Job Satisfaction of 0.050.

## **Conclusion**

Based on the research results, the following conclusions can be drawn that the academic Supervision has a direct positive effect on Teamwork of State Vocational Teachers in Medan City. In other words, the better the Academic Supervision, the better the Teamwork of State Vocational Teachers in Medan City, Academic Supervision has a direct positive effect on the Job Satisfaction of teachers of public vocational schools in Medan City. In other words, the better the Academic Supervision, the higher the Job Satisfaction of State Vocational Teachers. Teamwork has a direct positive effect on Job Satisfaction of teachers of public vocational schools. In other words, the better the Teamwork, the higher the Job Satisfaction of teachers of public vocational schools.

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### **Conflicts of Interest**

There is no interest conflict in this research. In this research.

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