Transformation of Educational Supervision with Digital Technology: Implementation, Opportunities and Challenges

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Sections Info	ABSTRACT
	Technological developments in the field of education pose challenges for teachers and school leaders. Rapid adaptation to change and increased professionalism and commitment are the keys to the success of education. Digital academic supervision emerged as a solution to overcome the weaknesses of conventional supervisors, that are often time-controlled and effective. This article aims to study the implementation of the use of digital technology in education supervision as well as identify opportunities and challenges. The study uses the Systematic Literature Review (SLR) to examine the implementation of digital technology in the supervision of education by analyzing 12 articles published between 2020-2023. The results show that digital supervisors can facilitate supervisory implementation and effectively improve teacher competence. The challenges faced by digital supervision include limited internet access, minimal technology mastery by senior teachers, and the need for adequate support. Implementation of digital academic supervision is an important step towards improving the professionalism of teachers and the quality of education as a whole, on the condition of adequate training, improved access to technology, and support from all stakeholders.

INTRODUCTION

The continuous development of education presents a series of challenges for teachers and school principals [7]. To be able to compete and improve the quality of schools, teachers and principals are required to adapt and keep up with change quickly. Moreover, the success of education is greatly influenced by the level of professionalism and commitment of its educators [6]. To achieve educational results, educators must possess high professionalism and strong dedication. In this case, supervision is carried out as an important step in developing the professionalism of teachers [13]. Education supervision can be performed by principal, the supervisor of education, or senior teachers who have special qualifications in carrying out educational supervision [3].

There are three factors to assess the effectiveness of education supervision, namely the teaching process, learning process, training activities, professional development, and efforts in developing human skills and capacities [14]. Supervision is needed as a

monitoring activity to provide guidance and administration to improve teachers' quality in educating, as a form of nurturing the potential and capacity of teachers. Supervision is designed to help teachers understand and carry out their daily tasks at schools, so they can utilize their knowledge and abilities to improve service to students, parents, and schools, and strive to make schools a more effective learning community [10].

Implementation effective academic supervision is not the same as supervision that focuses solely on inspection, where supervisors look for teacher mistakes, without giving guidance for improvement [25]. Good academic supervision involves guidance, constructive feedback, as well as assistance in addressing the problems and challenges faced by teachers in their teaching process.

The model of academic supervision applied in some schools is still conventional, such as visiting and observing classes, which can affect the readiness of teachers and increase their mental burden while teaching in front of the classroom. In fact, teachers teaching performance during the supervision process may not reflect the actual ability, but rather the result of a previous planned scenario [12]. The implementation of conventional supervision has many obstacles related to the limited time of the principal and the school supervisor [21], this could hinder the effectiveness of supervision. Supervision that is supposed to improve the quality of teaching and

teacher performance as well as the entire educational process become less optimal because it is not carried out thoroughly in a timely manner. The discussion forums between supervisors and teachers are also limited, so teachers do not get information about the supervision report result [27]. Conventional supervision model is also less adaptive to individual needs and changes in learning, especially in the era of digital education and the Industri 4.0 revolution. Therefore, the presence of technology can be a new innovation for supervisors in utilizing digital academic supervision (e-supervision) [12]. Technology that can be used by supervisors in carrying out digital-based academic supervision, such as online platforms or software to observe, provide feedback, support teacher development in teaching. With e-supervision, this process can be more efficient and effective as well as supporting efforts to improve the quality of learning in schools.

The study of transformation educational supervision with digital technology is crucial in the context of modern education. The educational process is expected to produce excellent and dignified human resources, therefore maximum efforts for renewal in the implementation of learning are required [1]. Implementing digital technology in education supervision can bring many benefits, but the challenges also need to be addressed with appropriate strategies so the transformation can have a positive and significant impact on the field of education. This article aims to examine the implementation of digital technology in education supervision, as well as identify its opportunities and challenges.

RESEARCH METHOD

This article employed a systematic literature review (SLR) methodology. A Systematic Literature Review (SLR) is a type of literature review that gathers and critically evaluate information [4]. Its aim is to offer comprehensive summary of the existing literature pertinent to a specific research question. There were three main steps involved in this study. The first step was formulating a research question. The second step focused on the search   procedure, which aim to locate the necessary data for the inquiry. Data were gathered from the Google Scholar Website to facilitate easier access to the required journal. The final step was the review phase. The researcher used twelve articles discussing digital academic supervision published between 2020- 2023. The research study selection process included reviewing titles, abstracts, and full text of journal articles, and key study findings were obtained and further analysed.

RESULTS AND DISCUSSION

Several research findings show that digital academic supervision has a positive impact in addressing various problems in conventional supervision, facilitating supervision implementation, and increasing teacher competence towards technology. The research study selection process included examining titles, abstracts, and full-text of articles, and the main findings of the studies were obtained and utilized for further analysis as shown in the following table:

Table 1. Table Selected Articles

No	Authors/ year	Research Title/ Journal Link	Research Focus
1.	Prilianti, R., 2020	Pengaruh Pemberian Reward, Insentif dan Tunjangan Terhadap Kinerja Karyawan (Studi Kasus pada Karyawan JNE Cabang Utama Surabaya)	Yuliani Sariwaty Siregar1, Yudianto Adhi Nugroho2, Alex Tlonaen3, Afryantho Dwi Basuki4, Fiska Devi Jiasti5, Yustinus Sudono Sigit6
2.	e – Jurnal Riset Manajemen PRODI MANAJEMEN Fakultas Ekonomi Unisma website : www.fe.unisma.ac.id (email : e.jrm.feunisma@gmail.com)	Pengaruh Pemberian Reward, Insentif dan Tunjangan Terhadap Kinerja Karyawan (Studi Kasus pada	Siti Nurhasanah*) Siti Asiyah**) Alfian Budi Primanto

No	Authors/ year	Research Title/ Journal Link	Research Focus
		Karyawan JNE Cabang Utama Surabaya)	
3.	4005 Sistem Kompensasi dalam Menjamin Kesejahteraan Guru Honorer di Sekolah Menengah Pertama Negeri – Agustina Pitriyani, Yustinus Sanda, Scolastika Nene Remi, Yesepa, Widyatmike Gede Mulawarman DOI: https://doi.org/10.31004/basic edu.v6i3.2779	Sistem Kompensasi dalam Menjamin Kesejahteraan Guru Honorer di Sekolah Menengah Pertama Negeri	Agustina Pitriyani1, Yustinus Sanda2, Scolastika Nene Remi3, Yesepa4, Widyatmike Gede Mulawarman5
4.	Liabilities Jurnal Pendidikan Akuntansi e-ISSN 2620-5866 Volume 2. No.3 Desember 2019 (222-236) Doi 10.30596/liabilities.v2i3.3993	Pengaruh Pelatihan Kerja Dan Kompensasi Finansial Terhadap Kinerja	MUTHOLIB
	e-Proceeding of Management : Vol.3, No.2 Agustus 2016 | Page 1871	Pengaruh Kompensasi Terhadap Motivasi Kerja Pada Karyawan Biro Pelayanan Sosial Dasar Di Sekretariat Daerah Provinsi Jawa Barat	Anny Kusumo Laminingru
	PUBLIK: Jurnal Manajemen Sumber Daya Manusia, Adminsitrasi dan Pelayanan Publik Universitas Bina Taruna Gorontalo Volume 10 Nomor 2, 2023	Pengaruh Keselamatan Kesehatan Kerja (K3) Dan Lingkungan Kerja Terhadap Kinerja Karyawan	Arwin Saputra1, Indra Kusdarianto2, Samsinar3
	Forecasting: Jurnal Ilmiah Ilmu Manajemen Vol 1, No 1 (2022) ISSN (cetak) 2621-7406 ISSN (online) 2656-6265	Analisis Strategi Pemasaran Untuk Meningkatkan Penjualan Pada Usaha Ibu Bagas	Irdha Yanti Musyawarah1, Desi Idayanti2

No	Authors/ year	Research Title/ Journal Link	Research Focus
		di Kecamatan Mamuju	
	PUBLIK: Jurnal Manajemen Sumber Daya Manusia, Adminsitrasi dan Pelayanan Publik Sekolah Tinggi Ilmu Administrasi Bina Taruna Gorontalo Volume VII Nomor 1 2020	Pengaruh Komunikasi Camat Terhadap Peningkatan Kinerja Aparat Di Kantor Camat Moutong Kabupaten Parigi Moutong	Sofyan Alhadar
	PUBLIK: Jurnal Manajemen Sumber Daya Manusia, Adminsitrasi dan Pelayanan Publik Universitas Bina Taruna Gorontalo Volume 10 Nomor 2, 2023	Pengaruh Motivasi, Lingkungan Kerja, Dan Kepuasan Kerja Terhadap Kinerja Karyawan Di Badan Usaha Milik Desa (Bumdes) Se-Kecamatan Sukasada	I. D. Wardhana1, N. K. Sinarwati2, F. Yudiatmaja3
	FORUM EKONOMI, 23 (2) 2021, 187-193 http://journal.feb.unmul.ac.id/ index.php/FORUMEKONOMI	Pengaruh kepuasan kerja terhadap kinerja karyawan	Ulkifli Azhari1, Erwin Resmawan2, M. Ikhsan3
	PUBLIK: Jurnal Manajemen Sumber Daya Manusia, Adminsitrasi dan Pelayanan Publik Universitas Bina Taruna Gorontalo Volume 10 Nomor 1	Pengaruh Pemotongan Tunjangan Selama Masa Pandemi Covid 19 Terhadap Kinerja Dengan Motivasi Sebagai Variabel Intervening Di Perum Lembaga Penyelenggara Pelayanan Navigasi Penerbangan	M. Kukuh Dharma Utama Universitas Bina Darma

No	Authors/ year	Research Title/ Journal Link	Research Focus
		Indonesia (Lppnpi) Cabang Palembang	
	PUBLIK: Jurnal Manajemen Sumber Daya Manusia, Adminsitrasi dan Pelayanan Publik Universitas Bina Taruna Gorontalo Volume 10 Nomor 1, 2023	Efek Transparansi Keuangan, Gaya Kepemimpinn, Lingkungan Kerja, Dan Insentif Terhadap Kepuasan Kerja Di Alfamidi Malengkeri	Zulkarnain Basir1, Yovika Ndaung2, Priskila Deran Tedemaking3, Fadilah Diwanti Aprilia4, Magfirah5
	Jurnal Pendidikan dan Kewirausahaan	Pengaruh Kepemimpinan, Lingkungan Kerja dan Kemampuan Kerja Terhadap Kinerja Karyawan	Ella Anastasya Sinambela1* , Utami Puji Lestari2
	PUBLIK: Jurnal Manajemen Sumber Daya Manusia, Adminsitrasi dan Pelayanan Publik Universitas Bina Taruna Gorontalo Volume IX Nomor 2, 2022	Pengaruh Lingkungan Kerja Non Fisik Dan Worklife Balance Terhadap Kinerja Pegawai Pada Kantor Dinas Kepemudaan Olahraga Dan Pariwisata Kabupaten Pati	Andika Ferdi Alsyah1 , Syarifuddin2
	PUBLIK: Jurnal Manajemen Sumber Daya Manusia, Adminsitrasi dan Pelayanan Publik Universitas Bina Taruna Gorontalo Volume IX Nomor 2, 2022	Pengaruh Kompensasi Dan Lingkungan Kerja Fisik Terhadap Kinerja Pegawai Pada PT Rajasaland	Sevynica Rianda1, Alex Winarno2

No	Authors/ year	Research Title/ Journal Link	Research Focus
		Bandung	

The previously chosen articles are being categorized and analysed into two discussions parts as follows:

Implementation of Digital Academic Supervision in Educational Institutions

The advancement of technology in education requires the principal, supervisors, and teachers to possess competencies in technology [21]. The era of the Industrial Revolution 4.0 presents challenges and opportunities that principals need to consider in designing a digital-based academic supervision [11]. Supervisors must be able to adapt to these challenges and adopt innovative strategies to ensure that education is quality, relevant, inclusive, and adaptive to the demands of the times [22]. As an innovative academic supervisor, the school principal must possess skills in digital technology to adapt to the changes occurs. Having skills in digital technology allows the school principals to be more effective in his role as a supervisor, able to adapt to change, and lead the school towards a better future.

Supervision is a continuous developmental activity to improve teaching conditions and improve the quality of education [26]. In this context, monitoring, evaluation, and training are carried out to ensure that teachers can provide effective teaching, so the students can achieve optimal learning outcomes. Education supervision requires time, dedication, and most importantly, adequate training to qualify for the role [9]. In the implementation of supervision, it takes time to carry out comprehensive observations and evaluations so that supervision can have a significant positive impact on the quality of education. Communication and collaboration with the school principals also needs to be done in developing new strategies [24], includes by identifying individuals involved in school development, building good communication with stakeholders, explaining new plans and strategies clearly.

The principal has a responsibility to carry out academic supervision, includes planning, implementation, and evaluation of teaching. Moreover, the school principal must be able to lead teachers, develop school programs that encourage creativity and innovation, and help teachers adapt to the digital age [2]. In academic supervision activities, web-based applications are perfectly suitable for use [19], as they can improve the effectiveness and efficiency of supervising. Several digital academic supervision models that can be developed or implemented according to some literature are using the applications Madrasah Smart Digital, e Sisaga, Academic Surveillance Applications (ASA), zoom, Microsoft Teams, Webex, Google Classroom, Google Drive, e learning, cisco, skype, Edmodo, Microsoft teams, UmeetMe and so on.

The academic supervision model using the Smart Digital Madrasah Platform employs application to facilitate virtual interaction among supervisor, principal, and teacher [27]. Academic supervision using Madrasah Smart Digital platform includes scheduling, planning the implementation, preparing evaluation instruments, and providing online discussion forum. During e supervision process, supervisors monitor the activities of teachers, provide evaluation, doing reflections and discussions. The supervisor gives a positive feedback to the teacher by discussing the problems and difficulties faced and providing solutions. As a result of research carried out by Saputra, the platforrm Madrasah Smart Digital platform effective in improving the teacher's ICT competence, it recommended tool for madrasah supervisors and online teacher training.

Meanwhile, e-Sisaga application is a web-based designed for comprehensive and professional academic supervision [19]. It facilitates online and blended academic supervision and supports development of religious education teachers. E Sisaga application feature demonstrative, evaluation, and communication function tailored for both supervisor and PAI teacher. It supports online teacher competence assessment, thereby enhancing educational quality.

In conducting digital academic supervision, the principal can also utilize the Academic Supervision Application (ASA). ASA is a web-based application designed to facilitate principals easier in conducting supervision [18]. ASA can be accessed through smartphones, laptops and PC, offering automated scoring, and digital monitoring data that can be reviewed or printed, as well as provide direct feedback to the teacher. The digital technology such as a voice recorder is also often used to perform observations [15]. Online video conferencing allows for continuous monitoring of the learning process through virtual class visit, and scheduled based on agreement between principal and teacher. The results of the evaluation and recommendations for improvement are conveyed to supervised teacher. Digital supervision activities for each educational unit can also be done through online interviews [16]. The principal prepares materials, evaluation instruments, and special programs to provide guidance to teachers. This design is created as a guide to the implementation of supervision, to ensure that no important aspects are missed.

The phase of a digital-based supervisory model that can be implemented by madrasah supervisor includes some important steps [17]. First, madrasah supervisor assists the teacher and madrasah principal, and selects the suitable online tools. The supervisor scheduled academic and managerial supervision. During supervision process, the supervisor identifies obstacles faced by the teacher and madrasah principal, provides alternative solutions and follow up to address the problems effectively.

Individual academic supervision by the principal involves planning by creating program and instrument using the google drive and google form

applications, conducting online class visits, observations, and discussions with teachers [15]. Academic supervision of teachers includes support services to enhance teacher ability to develop learning tools, lesson plan, teaching processes, and assessing learning outcomes. The assistance primarily uses Google Drive, Google Classroom, e-learning and other applications [5]. The principal supervises learning tools to assess and evaluate teacher's instructional material, offering feedback, to enhance teacher's competence. After identifying problems, the principal provides supports through individual or group training session using video calls or messaging app. They also guide lesson plan development openly during school meetings, fostering a conducive environment for teaching improvement.

Opportunities and Challenges in the Implementation of Digital Supervision

Supervision is an essential component in achieving optimal quality and educational goals by overseeing teaching quality and supporting teacher professionalism [25]. The combination of support, guidance, and consultation provided by supervisors helps create a better learning environment and supports the progress of the entire educational community. As a supervisor, the principal is responsible for overseeing, correcting and seeking initiatives to ensure the operation of all educational activities [27].

Effective academic supervision is crucial in enhancing teacher competence, serves as a model for the principal and teachers in implementing academic supervision in the era of information technology [28]. Various challenges in conventional supervision have prompted the shift towards online academic supervision [29]. It aims to enhance the teacher's pedagogic competence to the maximum in school learning. Principals, supervisors, and teachers need to possess high competencies, especially in the digital field, to cope with rapid technological advances [8]. Monitoring in supervision is expected to help teachers broaden their knowledge of learning developments and innovations in the era of society 5.0. Teachers should be able to use of technology in the process of learning, the technology used should be capable of supporting the achievement of learning goals [3].

Implementation of digital supervision is designed to monitor teacher activity continuously in a flexible manner without distances and time constraints. This setup facilitates easier access to provide feedback on the learning process, and discuss the solutions to solve problems faced by teachers [21]. Utilizing online academic supervision can simplify overcoming the barriers facing teachers, adapting to changes in teaching methods due to the pandemics, improving competence in technology, and providing flexibility in supervising process.

The digitalization of academic supervision program makes the supervision process in schools more effective and efficient for the principal in monitoring and overseeing the teaching activities [18]. In addition, teachers have benefits from the ease

in administrative tasks, giving more time to improve teaching competence and quality of education. Electronic- assisted supervision models can be developed to address the problems such as numerous of institutions and supervised teachers, and remote geographical conditions [20]. The academic supervision model also help to improve the ICT competence of teachers, and have a positive impact on the quality of learning, as well as provide effective tools for madrasah supervisors [29].

Despite the significant benefits of digital academic supervision, there are several challenges and weaknesses that need to be addressed, including the lack of direct interaction between supervisor and teacher [15], which can reduce the effectiveness of communication and personal relationships that are typically easily intertwined in direct interactions. Additionally, inadequate internet access, as well as the problems faced by supervisors and teachers during the implementation of online supervision, are also challenges for implementing digital supervision [29]. Lack of technological proficiency of senior teachers also becomes an obstacle in implementation of supervision, the minimum of adequate support facilities [29], unstable internet access, and the need for teachers to provide their own internet packages are challenges that can affect the effectiveness of digital academic supervision [1]. By identifying these challenges, the implementation of digital academic supervision can be more effective and have a positive impact on improving the quality of education.

CONCLUSION

Implementation of digital supervision is an important step aligned with technological advances and the demands of 4.0 Industrial Revolution era. While digital academic supervision has many advantages such as improving teacher ICT competence, time efficiency, and flexibility, there are also challenges or weaknesses that need to be addressed. These include the lack of interaction between supervisor and teacher, limited internet access, insufficient technological proficiency among senior teachers, and the need for adequate supporting facilities.

The implementation of digital academic supervision in educational institutions has great potential to improve the quality of teaching. To achieve optimal results, it requires adequate training, improved access to technology, and support from all stakeholders. Therefore, digital academic supervision can be an effective tool in improving teacher professionalism, and improving the overall quality of education. For further researcher are able investigate the specific strategies that enhance the interaction between supervisor and teacher in digital academic supervision, such feedback mechanism, and collaborative platform that mitigate the lack of face to face interaction.

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