Implementation of Online Learning in Indonesian Vocational Education During COVID-19 Pandemic: A Comprehensive Review

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**Abstract.** The COVID-19 pandemic forces the policies to take students off and start implementing learning methods using an online system or distance learning. This research aims to portray the condition and challenge of online learning implementation at Vocational High School during the COVID-19 Pandemic in Indonesia. This research is a systematic literature review based on kitchenham method. There are 9 (nine) relevant studies used in this research according to the specified requirements. Published studies used in this research are explored between 2012 until 2020 in order to get an update information about online learning implementation in Indonesian Vocational Education. This study explains 3 (three) main discussions: the condition of online learning implementation, challenges and obstacles in online learning implementation, and innovation in online learning implementation. This research found that the challenges and obstacle to online learning in SMK come from 3 (three) related components, namely Learning Process, Teachers, and student. To overcome the challenges and obstacles, there are several innovations that can be applied by teachers and schools, such as Self-Regulated Learning, Blended-learning, Interactive Multimedia, Social Media and Education Applications.

# INTRODUCTION

Education in Indonesia has changed to a distance learning system (PJJ) since the Corona Virus Disease 2019 (Covid-19). The beginning of the emergence of Covid-19 first appeared allegedly in the animal market of the city of Wuhan, China. Until March 2020, when it finally spread and became the focus of Indonesian attention. In Indonesia, the government announced two positive cases of Covid-19 patients for the first time.

Since the emergence of the corona virus outbreak, various problems have arisen. Because the virus does not only attack humans, but also has an impact on the world economy, and affects social life in various countries. One of them is in the world of education in Indonesia, where previously learning was done face-to-face (offline), but during this Pandemic the learning system is no longer valid (Sri Harnani, 2021).

The Covid-19 epidemic has given us a glimpse at how education may be implemented in the future using digital technology. However, technology cannot replace lecturers, teachers, or student-teacher interactions. This is because education is about more than just learning facts; it's also about learning ethics, cooperation, and competence. This pandemic forces the education component in Indonesia to increase the creativity of each individual in using information technology to develop education in Indonesia.

Students can train and instill the habit of becoming independent learners during this pandemic period by attending numerous online classes or webinars. Furthermore, students can collaborate with one another to solve learning problems and deal with real-world issues. This condition presents a difficulty not only for students, but also for lecturers in the delivery of education, as lecturers must ensure that students comprehend the subject.(Sri Harnani, 2021).

The government takes various ways so that education can continue to run in this pandemic era, because education is a very important asset for a nation for the progress of a country. The government finally made a new policy by implementing a learning system from their respective homes, namely online (network learning) through various platforms ranging from zoom applications, google meet, e-learning, e-students and other learning media.

This method utilizes an online network that is definitely connected to the internet by staying at home and doing all learning activities online. The online education technique is carried out by various levels of education, ranging from kindergarten, elementary, junior high, high school to university levels. In online learning, students are usually required to be more creative, such as being given the task of creating content on Youtube containing learning materials, making TikTok videos containing positive information, making summary posters of the material, making informative articles, posting videos containing knowledge. on various social media, making summaries of papers in power point by giving animations to writing, and other creative ideas.

The implementation of distance learning in SMK has been regulated since 2014 in Permendikbud No. 119 of 2014 concerning the Implementation of distance education at the primary and secondary education levels. The regulation states that Vocational Schools can open Distance Education (PJJ) which is one of the formal education services that stands alone but is part of Vocational High Schools (SMK).

At the beginning of the implementation of online learning in Indonesia, students and students experienced several difficulties ranging from technological stuttering, internet problems, network problems in some remote areas, signal difficulties, quota cost overruns, lack of understanding of some practical and calculating subjects. .

In addition, complaints from parents of students at the kindergarten and elementary school levels also arise because they have added to their burden of supervising and assisting their children in the learning process. Not only students, teachers also have to adapt again to the existence of distance learning (online) where the learning system utilizes technology as a learning medium. Not only students, teachers also have to adapt again to the existence of distance learning (online) where the learning system utilizes technology as a learning medium.

The goal of this study is to present the state and challenges of online learning implementation in Indonesian Vocational High Schools during the COVID-19 Pandemic through a comprehensive literature review utilizing the Kitchenham method.

# rESEARCH METHOD

A systematic literature review is a way of identifying, assessing, and interpreting all findings on a study issue in order to answer previously specified research questions (Nastiti & Wahjusaputri, 2019). The SLR approach is carried out in a methodical manner, with stages and protocols that allow the literature review process to minimize bias and the researchers' subjective understanding. SLR is a literature review method commonly used by researchers in the pharmaceutical and medical fields, although it can be said that Barbara Kitchenham only started bringing it into the computing world, specifically for software engineering in 2007 through her paper entitled Guidelines in performing Systematic Literature Reviews in Software Engineering.

This Systematic literature review has 5 (five) phases, which are identify research question, search relevant studies, determine inclusion and exclusion criteria, data quality assessment, data collection and analysis.

## Research Question

The needs of the study issue determine the research questions. These are the research question in this study:

* **RQ1**: During the Covid-19 Pandemic, how is online learning being implemented in vocational high schools?
* **RQ2**: What are the difficulties and roadblocks to integrating online learning in a Vocational High School during the Covid-19 pandemic?
* **RQ3**: During the Covid-19 epidemic, what advances were implemented to improve the effectiveness and quality of online learning?

## Search Relevant Studies

This phase aims to gathered the relevant studies in order to answer research question (RQ) and other related references. In searching for related studies, it starts with determining the search keywords for literature. The accuracy of the literature search will be determined by the knowledge of synonyms and potential word substitutes. In this research, the keywords used are *"Online Learning in Vocational Education"* and *"Online Learning in Vocational High School Indonesia"*. The next step is to figure out where the literature search came from. Because the literature we collect will be extensive, possibly hundreds or thousands of papers, it is recommended that we employ software tools to help us manage it, in this case Mendeley. The studies used in this study were taken from several journal databases, namely ScienceDirect, IEEE, Scopus, and other related Journal databases. The study used in this research is in the 2011-2021 timeframe.

There are 32 relevant studies found in this phase. All studies are in accordance with predefined keywords.and research questions.

## Determine Inclusion and Exclusion Criteria

After all the literature is obtained, the next step is to create criteria that function as filters in the selection and rejection of literature, namely inclusion and exclusion criteria. These are the inclusion and exclusion that used in this study:

**TABLE 1.** Inclusion and Exclusion Criteria

|  |  |
| --- | --- |
| **Inclusion**  | **Exclusion**  |
| Studies related to online learning in vocational high school  | Studies without a strong validation or experimental result |
| No duplicate studies  | Unpublished and Incomplete paper |
| Studies are in English or Bahasa | Studies are before 2010 |

## Quality Assessment

The data discovered in SLR research will be assessed using the following quality assessment criteria questions.:

* **QA1**: Was the journal article published between 2011 and 2021?
* **QA2**: Is there a list of the innovations employed in the execution of online learning in the journal paper?
* **QA3**: Is there a condition, problem, or hindrance in the implementation of online learning in the journal paper?

## Data Collection and Analysis

# After conducting a quality assessment, 9 papers were obtained that could be synthesized into research discussions.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author** | **Title** | **Year** | **Research Question** | **Argument** |
| (Ramanta & Dwi Widayanti, 2020) | “Pembelajaran Daring di Sekolah Menengah Kejuruan Putra Indonesia Malang pada Masa Pandemi COVID-19” | 2020 | RQ1, RQ2 | Online learning is a new learning model for students so that during its implementation students feel its strengths and weaknesses. Students want learning methods that are suitable for their conditions at home, so that they can study comfortably. The interaction of teachers and students can be well established if in the online learning process, the teacher understand their condition and adjusts their learning strategies. |
| (Adriani, Khoirot, Sawitri., & Nurjanah., 2021) | “Dampak Pembelajaran Jarak Jauh Pada Masa Covid-19 di SMK Muhammadiyah 1 Sukoharjo” | 2021 | RQ1, RQ2 | This study shows that students are not satisfied with the online learning system, students are not satisfied with the distance learning method (PJJ) they are currently using.One of the reasons for student dissatisfaction is inadequate quota and internet access which causes students to not receive material optimally. |
| (Edy, Widiyanti, & Basuki, 2020) | “Revisiting The Impact of Project-Based Learning on Online Learning In Vocational Education: Analysis of Learning in Pandemic Covid-19” | 2020 | RQ2 | This study reveals that professors are unaware of their students' reason for engaging in online learning. One of the factors is the lack of direct interaction between professors and pupils. Therefore, this study suggests teachers to have a learning approach that can increase students' motivation in participating in online learning. |
| (Mulyanti, Purnama, & Pawinanto, 2020) | “Distance Learning in Vocational High Schools during the COVID-19 Pandemic in West Java Province, Indonesia” | 2020 | RQ1, RQ3 | This study found an imbalance of online learning facilities in in West Java’s private and public vocational high schools. In general, students feel that online learning is not as effective as face-to-face learning, although until now they are still able to understand and be active in the learning process. |
| (Huwaidi, Nandiyanto, & Muhammad, 2021) | “The Urgency of Online Learning Media during the Covid- 19 Pandemic at the Vocational School in Indonesia”  | 2021 | RQ1, RQ3 | This study shows that the use of multimedia and social media was an effective alternative in online learning. This alternative is used to avoid monotonous and boring learning methods for students. |
| (Syauqi, Munadi, & Triyono, 2020) | “Students’ perceptions toward vocational education on online learning during the COVID-19 pandemic” | 2020 | RQ1, RQ2 | This study shows that most students feel online learning is no more effective than face-to-face learning. This is influenced by the teacher's lack of ability to manage, create and deliver learning materials to students. |
| (Aydin, Akkan, Arpaz, & Koparan, 2015) | “Online learning in vocational school: focus on students’ perceptions” | 2015 | RQ1, RQ2 | This study shows that teacher and student communication is an important factor in the formation of perceptions and approaches to online learning. Lesson planning, assessment, and curriculum are also essential factors in the success of online learning.. |
| (Cigdem & Yildirim, 2014) | “Effects Of Students’ Characteristics On Online Learning Readiness: A Vocational College Example” | 2014 | RQ1, RQ2 | This study shows that SMK students are still less literate about the use of computers and the internet which results in delays in the transfer of knowledge from teachers to students.  |
| (Krismadinata et al., 2020) | “Blended Learning as Instructional Model in Vocational Education: Literature Review” | 2020 | RQ3 | Blended learning combines face-to-face and online learning method. This learning method facilitates learning during the pandemic because it makes learning flexible, can be done in various places, as well as other educational facilities. |

# RESULT AND DISCUSSION

## This section discusses the review based on a predetermined research question. Research questions consist of Implementation of online learning in Vocational High School during the Covid-19 Pandemic, Challenges and obstacles to implementing online learning in Vocational High School during the Covid-19 pandemic, and Innovations in implementing online learning in Vocational High School during the Covid-19 pandemic.

## Implementation of online learning in Vocational High School during the Covid-19 Pandemic

Indonesia is still looking for solutions so that students can still get their learning and education rights. Covid 19 has harmed at least 1.5 billion school-aged children in 188 countries, including 60 million in Indonesia, according to UNESCO until April 1, 2020. Every country attempted to create the finest policies possible in order to retain its educational services. Indonesia also faces a number of challenges and roadblocks that must be overcome immediately, including: (1) technological differences and disparities between urban and rural schools, (2) teacher competence in using applications and learning technologies, (3) limitations and limited resources to facilitate the use of educational technology like the internet, and (4) In online learning, the teacher-student-parent relationship is not yet established.. (Futra, Primahardani, & Putra, 2021).

In Indonesia, the establishment of a physical distance policy serves as the foundation for implementing learning from home utilizing technology. Teachers, students, and parents are unprepared for the deployment of home learning due to the sudden use of this learning technology. Several policies have been published by the Indonesian Minister of Education and Culture to control educational activities during the pandemic. This was announced in Circular Letter No. 4 of 2020, dated March 24, 2020, and titled "Implementation of Educational Policies in the Emergency Period for the Spread of Coronavirus Disease (Covid-19)." School principals, as the driving force behind and in charge of the learning process in schools, must act quickly in response to the Minister of Education and Culture's circular letter asking schools to integrate learning from home.

To be more specific, there are 6 (six) policies that are detailed in detail. The policy of learning from home, on the other hand, is the most basic thing to modify in the way students and teachers teach and learn. So far, this study from home policy has had a significant impact on teachers' and students' habits and conduct. Teachers are perplexed by this new policy because they are still looking for the proper pattern for learning from home. The optimum method is to engage in or aim for network-based or online learning. The online learning method differs significantly from the face-to-face learning that takes place in schools. Teachers and students interact remotely rather than face to face, allowing teachers and students to be in separate locations. Positively, this learning aids in maintaining learning continuity during the pandemic. Teachers and students will be able to meet in their respective places or houses without having to leave the house. Changing patterns or habits, on the other hand, is tough, and it is natural when changes happen quickly and abruptly. Educators were taken aback since they had to make rapid changes to the system, syllabus, and learning process. While studying at home, students stammered because they had a stack of assignments. Meanwhile, parents of students are anxious as they follow their children's learning with tasks, in addition to worrying about their own lives and careers in the midst of a crisis. (Mulyanti et al., 2020).

## Challenges and obstacles to implementing online learning in Vocational High School during the Covid-19 pandemic

According to the findings of the data synthesis, the challenges and obstacles to online learning in SMK are caused by three (three) connected components, namely Learning Process, Teachers, and student.

### Challenge and Obstacle in Learning Process

### The Covid-19 pandemic has forced the world of education to perform acrobatics so that the teaching-learning process continues and the learning objectives in schools are achieved. It is not easy, especially for vocational high schools (SMK) whose teaching materials are more practical. Students are also required to practice field work (PKL) in companies. However, the pandemic has forced the Government to limit social mobility to prevent the spread of the virus. The DKI Jakarta government started it on April 10, 2020. Offices, business activities, and public transportation were restricted. Schools are even closed, and the teaching and learning process is carried out online or distance learning (PJJ) . The implementation of PJJ is not immediately able to answer all existing problems, restrictions on community activities during the pandemic are the main problems felt by all vocational schools in Indonesia. This was due to the implementation of the Work from Home (WFH) policy in almost all companies during the pandemic. In fact, for some majors, street vendors must be carried out in the workplace or company. As a result, when street vendors apply for street vendors, many companies refuse. Even if the application for street vendors is accepted, there are some parents who do not allow students to take part in street vendors due to concerns that they will be exposed to the COVID-19 virus at street vendors' locations (Kearns, 2012).

### The implementation of practicum for students is also one of the obstacles during this pandemic because the learning system is carried out online. To understand the subject taught by the teacher, SMK students must practice. If not, worry that they do not have the expertise in the vocational. Therefore, the Minister of Education and Culture (Mendikbud) together with the Minister of Home Affairs (Mendagri), Minister of Religion (Menag), and Minister of Health (Menkes), agreed to adjust learning policies during the Covid-19 pandemic. The agreement was contained in the Joint Decree (SKB) of the Four Ministers which was decided after getting the survey results regarding the impacts arising from distance learning (PJJ) during the Covid-19 pandemic. As a result, for the SMK level, practical learning requires the physical presence of students and teachers in the practicum room with strict health protocols.

### Challenge and Obstacle From Teacher

Online learning provides its own challenges and obstacles for teachers or teachers in SMK. From the results of data synthesis, the main challenge in implementing online learning for teachers is the lack of skills or abilities of teachers in using computer technology. The rapid development of technology has a big influence in the field of education. According to Huwaidi et al., (2021), with the innovation in ICT, people can quickly learn, and the delivery of information becomes easier. Technological devices like smartphones, computers, and internet today are very important in supporting daily activities. It is very important for teachers to master and utilize ICT in learning. However, there are still teachers or teachers who are less proficient and lack the ability to utilize computer technology. When it comes to integrating ICT into the classroom, teachers confront a number of obstacles, including their knowledge, skills, beliefs, and attitudes. (Sturgess, 2004). Many teachers are hesitant to employ ICT in their classrooms and are anxious to put their ICT skills to use. Furthermore, many teachers are unaware of the educational benefits of ICT (Gündüz, Alemdağ, Yaşar, & Erdem, 2016). This challenge can be an obstacle in carrying out online learning during this pandemic. This challenge can also be seen from the teacher's lack of ability to manage and create materials that attract students to do online learning, as a result the transfer of knowledge and learning materials to students is not optimal.

### Challenge and Obstacle From Student

The implementation of Online learning also brings obstacles and challenges for vocational students. Some of the weaknesses felt by learners related to activities they encounter during online learning that do not exist during the learning process in school include: (1) More tasks than regular learning in school; (2) Difficulty understanding the material because it is only given but not explained; (3) If learners do not understand the material and the task, they cannot ask directly at a moment's time; (4) Some students understand better if explained directly by the teacher; (5) More wasteful spending because you have to buy more internet quotas; and (6) Technical constraints such as poor internet connection (Cigdem & Yildirim, 2014).

The obstacles that students feel also come from internal and external factors. Constraints come from internal factors, namely obstacles that arise from within the student, including: (1) Self-study at home makes the learning spirit of learners reduced; (2) Often beset by laziness and boredom; and (3) The number of tasks that come simultaneously makes learners very burdened. While the constraints of external factors are factors derived from the environment or infrastructure facilities owned, including: (1) Not all learners have online learning facilities, for example learners do not have smartphones; (2) Collection of tasks late because there is no internet quota; (3) Some parents do not have income due to the impact of Covid-19 which affects the purchase of internet quotas for the collection of student assignments; (4) Some parents do not monitor the learning activities of learners while at home.

## Innovations in implementing online learning in Vocational High School during the Covid-19 pandemic

In overcoming obstacles and challenges in carrying out online learning, teachers must make several strategic efforts to keep teaching and learning activities running. The following are innovations that can be used by teachers or schools in overcoming the obstacles and challenges of online learning:

*Self-Regulated Learning*

The learning methods that learners want cannot be separated from the self-regulated they have. Self-regulated learning is the knowledge that a person has about effective learning that is used to achieve learning goals in the right way and time. Of course, learners convey learning strategies that they like and according to their current conditions at home. As a result of this situation, subject teachers must be able to comprehend and adapt to the needs of students. Because self-regulated learning in learning and achievement of learners is not only special (distinctive) but also has implications for how teachers should interact with learners (Ramanta & Dwi Widayanti, 2020). The interaction of teachers and learners will be well established if in the online learning process, teachers understand the conditions of learners and adjust their learning strategies. When learners already have good self-regulated, then they can easily learn and understand the material, also perform tasks according to the priority scale and the most effective way according to them. In accordance with research conducted by (Huwaidi et al., 2021), that self-regulated learning can be used as an individual encouragement and activity to manage his own learning. On the other hand, self-regulated learning can be used by educators as a learning model / strategy to improve the learning process.

*Blended-Learning*

The blended learning model is one of the learning models that can be used with technology-based media. According to Indriani, Fathoni, & Riyana (2018) Blended learning is when a student uses a combination of web-based tools to attain educational objectives. According to Thorne (2013), Blended learning is a combination of traditional classroom instruction with e-learning and multimedia technologies such as video streaming, virtual classrooms, and online text animation. While Graham (2005) mentions blended learning more simply as learning that combines online learning with face-to-face (Bridges, Botelho, & Tsang, 2010). For example, SMKN 5 Bali has carried out blended learning in the department of Industrial Electronics Engineering during the odd semester of TA. 2020-2021, with a grouping block system. This is slightly different from blended learning systems in general. Grouping block is a system of blocks that are divided on the basis of small groups. For theoretical learning in some subjects still through online by using platforms such as google classroom and e-learning. So that mixed learning can be carried out with results as expected.

*Interactive Multimedia*

Interactive multimedia is a medium that combines video, text, animation, sound and graphics. According to Hamid, Sentryo, & Hasan, (2020) Interactive multimedia is a tool that combines text, graphics, animation, music, and video pictures to create dynamic and interactive presentations. According to Krismadinata et al., (2020) Interactive multimedia is the use of computers to create and integrate text, graphics, music, and moving images (video and animation) by connecting links and tools that allow users to navigate, begin, create, and communicate. According to Dadang (2021) the type of interactive multimedia is divided into two parts, namely: Online interactive multimedia is an interactive media that is the way it is delivered through channels / wires / channels / networks. Examples are Web sites, Yahoo messengers, Zoom Meetings, Google meetings and so on. This type of media includes top-line media, whose target community is broad and includes many communities. Offline interactive multimedia is an interactive media whose presenter way is not through the path / wire / channel / network. Examples of interactive CDs: Company Profile, Learning Media. This media includes the bottom-line media because the target, is not too broad and only covers the community in certain areas only.

*Social Media and Education Application*

The use of social media is also an innovation that can help teachers in conveying subject matter to students. Currently, many social media that have been utilized by the public include Facebook, Instagram, Twitter, Youtube, Whatsapp, etc. Social media, like Twitter, Instagram, and Facebook, have policies that require a minimum age of 13 years to have an account on the social media. For the Whatsapp application that is quite popular in Indonesia, it does not currently require registration to have an account because the phone owner can immediately automatically use this application if it has registered a mobile number that is associated with the age of the user who has an ID card that is 17 years old. Social media can be a means and media that makes it easier for teachers to be able to share information, materials, tasks, and collection. (Saxena et al., 2018) Of course this will also help students in running the online learning process. In addition to social media, teachers can also take advantage of online learning sites such as Maya Classes in The Home Learning Portal, Edmodo, Google classroom and so on. There are also many educational applications that provide free learning such as teacher rooms and Home Learning Portals.

*Parents Support*

In addition to learning methods and technologies, the role and support of parents is also important in succeeding online learning. The parents support is very important because while at home, parents are monitoring the activities of learners. Therefore, parents should know the activities of learners at home during the online learning process. In addition, learning facilities are also influential in the online learning process, especially online learning is identical to the internet and quotas. So that parents spend additional costs for the purchase of internet quotas as a support for the learning process of learners at home. Another obstacle experienced by learners is the material received by incomplete. If the material received by learners is incomplete, it will interfere with the learning process (Ramanta & Dwi Widayanti, 2020).

# CONCLUSION

The goal of this study is to present the state and challenges of online learning implementation in Indonesian Vocational High Schools during the COVID-19 Pandemic through a comprehensive literature review utilizing the Kitchenham method. There are 10 (ten) relevant studies used in this research according to the specified requirements. Published studies used in this research are explored between 2012 until 2020 in order to get an update information about online learning implementation in Indonesian Vocational Education. This study success to answer all the research question which are: the condition of online learning implementation, challenges and obstacles in online learning implementation, and innovation in online learning implementation.

The online learning method differs significantly from the face-to-face learning that takes place in schools. Positively, this learning aids in maintaining learning continuity during the pandemic. Teachers and students will be able to meet in their respective places or houses without having to leave the house. Changing patterns or habits, on the other hand, is tough, and it is natural when changes happen quickly and abruptly. This research found that the challenges and obstacle to online learning in SMK come from 3 (three) related components, namely Learning Process, Teachers, and student. To overcome the challenges and obstacles, there are several innovation that can be applied by teachers and schools, such as Self-Regulated Learning, Blended-learning, Interactive Multimedia, Social Media and Education Applications.

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