



## Innovation of Vocational Technology Education

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### Internet Utilization and Access for Vocational School Teachers at during the COVID-19 Pandemic

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#### ABSTRACT

The aim of this study is to find out the utilization of the internet and the internet access of vocational teachers at the vocational schools during the COVID-19 pandemic. The research uses a descriptive quantitative method and the research instrument used was a set of questionnaires distributed to 267 vocational school teachers in West Java before and during the COVID-19 pandemic. The research variables include the utilization aspects and the vocational teachers' access to the internet at home and at school in searching for learning material resources. The data obtained were analysed using statistical analysis. Results show that 82% of teachers used the internet to find the subject-related resources, 66% possessed teleconferencing facilities, 63% already had internet connections at home. Furthermore, teachers' internet usage frequency during the COVID-19 pandemic was higher than before COVID-19. Teachers who work from home used the internet longer during the COVID-19 pandemic; more than 5 hours a day, compared to pre-COVID-19; which was 1-2 hours. Teachers who work from school also used the internet 3-4 hours longer during the COVID-19 than prior to the COVID-19 pandemic, which was around 1-2 hours.

#### 1. Introduction

During this COVID-19 pandemic, students and teachers are forced to interact and carry out the learning process virtually. The COVID-19 phenomenon has created challenges both for the students and the teachers in conducting online learning, such as the selection of learning tools, equipment, applications, and also the communication preferences. Along with the changes in the learning paradigm, it also requires teachers to continuously improve their classroom management specifically during the pandemic. The current teaching and learning demand learning to use learning media along with digital technology (Dhawan, 2020; Kahila, et.al., 2019). In line with the demand and changes in learning, teachers should also possess related technological competencies (Uerz et al., 2018) i.e. in Information and Communication Technology (ICT) (Almerich, Orellana, Suárez-Rodríguez, & Díaz-García, 2016; Kubrický & Částková, 2015b; Kubrický & Částková, 2015a). This phenomenon has introduced a challenge within traditional teaching approach in terms of modern media usage (Zhao et.al., 2018).

The changes that occur in 21st-century learning is indeed a challenge for vocational teachers because the facilities and infrastructure at vocational schools need to be integrated with today's industrial world, which eventually relates also to the issue of vocational professional development in the 21st century (Quesada et.al., 2020; Yasak et.al., 2015). Currently, learning can be conducted virtually or by remote learning (Dhawan, 2020); in other words, space is not a mandatory requirement. However, teachers should acquire the skills to manage remote learning as part of their literacy skills (Saripudin et.al., 2020). In line with this, Suartini (2019) also found that vocational teachers' performance is somehow intertwined with the teachers' abilities to develop online learning such as illustrating laboratory learning in replacement of physical laboratory facilities at schools.

In the Fourth Industrial Revolution (Industry 4.0) the demand for vocational teachers is that they should also be skilful industry workers (Ana et.al., 2018). The character of skilled workers in Industry 4.0 is an essential feature that must be prepared immediately for industrial challenges as characterized by industries integrating automation technology with cyber technology. The impact of Industry 4.0 is the preparation of various forms of education that follow industrial progress. The impact of the 4.0 industry is the development of different types of education that incorporates industrial growth. Therefore, learning in Industry 4.0 is somewhat linked to the use of the internet in the learning process, and it should not be surprising that vocational teachers need to improve technological skills, such as the ability to use computers and the use of online learning media. In addition, the ability of teachers to use Microsoft Word, Microsoft Excel, and PowerPoint applications is also critical in promoting the use of the internet to enhance classroom teaching skills (Saripudin et.al., 2019).

In the context of learning i.e. in the Fourth Industrial Revolution, the vocational school curriculum has been noticed to emphasize that the learning process should focus and be experienced by students and teachers and less on normal learning through typical knowledge resources. Teachers serve as facilitators and motivators of learning (Ana et.al., 2018). In addition, the rapid growth of internet technology should facilitate the access of information so students can quickly access the various literature and research references required. Students can also access the content without restrictions of time and space. Additionally, ICT development has led to changes in behavior patterns, teaching patterns, performance patterns, and changes in facilities.

Another issue with the use of the internet in the education sector is the change in the facilities used. Consequently, the teachers and students need to quickly adapt. Research conducted by Meirawan et al., (2019) showed that the availability of computers and Internet connectivity both at school and at home has restricted infrastructure for less than 20% of respondents. Needless to say, the availability of Internet connectivity for home use create opportunities for teachers to optimize their abilities to enhance the quality of learning in the classroom.

Furthermore, using the Internet as a learning platform will deter libraries in schools from being a learning resource which makes students less interested. Majid et al., (2016) found that the use of school libraries and their services was very poor. The majority of students ask their classmates and peers to help them source for information. Only a small number of students consult their school librarian. Internet use or the ICT use is also influenced by vocational teacher motivation (Meirawan et al., 2019), vocational teachers' beliefs (Mukminin et al., 2019), and students' involvement in using the internet or Information and Technology.

## **2. Literature Review**

### **2.1. Internet Access**

There has been a clear disparity exists among older adults when making age group comparisons; the young-old are more likely to access and use the Internet as well as having better Internet skills than their older counterparts (Hunsaker & Hargittai, 2018). In addition, higher education (Scheerder et.al., 2019) also affects people who have access to the Internet. However, there is no difference between gender disparities in access to the Internet (Hunsaker, & Hargittai, 2018; Saripudin et.al., 2020). Besides access, the ability to use the Internet effectively and efficiently is an essential aspect of accessing the internet. Internet skills are critical in deciding how to operate

computers and handle documents (Saripudin et.al., 2019). Therefore, it is necessary to know the tools used. Internet tools are commonly used by teachers to retrieve teaching materials and improve their teaching ability. In addition to being able to provide educational knowledge as well as other aspects of life, such as sports, eating, drinking, economics, social, and political, internet tools also allow teachers and students to develop their skills and learning for a range of subjects (Munshi, 2014) stated that social networking tools on the internet bring a lot of benefits to the world of education (Nggondi & Mauwa, 2019).

## **2.2. Internet as A Learning Resource**

In the digital age, social networks are making significant improvements to the way we lead our life. According to Boyd & Ellison (2007), Social Networking Sites are web-based platforms that enable individuals to create a public or semi-public profile within a virtual social community to offer a link to a list of other people with whom they share connections and views. People may also see social networking tools to be like a forum for creating individuals or groups profiles in an organization from which they may interact. Social networking tools help people connect more efficiently with friends, families, and colleagues. (Facebook, 2008). It allows users to communicate with each other in the chat room by either synchronous or asynchronous messages, as well as sharing music, images, internet links, and other content or update their social networking in the companies or even upgrade their software for learning goals (Ellison, 2007). The innovation and advancement of these social networking platforms are impressive in connecting users online. –As in individuals, a society is also related through complex social networks (Granovetter, 1973). There are several types of bonds that connect one another such as emotional, authority, reputation, and communication (Wasserman & Faust, 1994).

Aulia, et.al (2020) found that the use of the Internet provides substantial learning outcomes of 20% and that the average level of achievement of using the Internet as a learning resource is 93% which can be categorized as outstanding. In the current context, the use of the Internet is inseparable from the many social networking platforms used to promote learning opportunities that people use online, such as Facebook learning (Nugraha et.al., 2020) and Quipper School in a virtual classroom framework, will make students skilled in digital simulation subjects and also improve their learning experiences in both digital simulation subjects and other subjects (Irwanto et.al., 2020).

The use of the Internet as a source and means of learning can be introduced as follows:

1. Browsing or surfing is a general term used to explore cyberspace or the internet.
2. Resourcing is turning the internet into a teaching platform. The role of the internet as a source of knowledge is used to collect information and data on the teaching material presented. Information related to a website address will be visited as a learning resource that has been identified in advance through the information given in the teaching manuals and other documents.
3. Searching is the process of finding learning opportunities to supplement the materials that will be offered to students.
4. Consulting and communicating (consultation and communication through e-mail and mailing lists) (Rahman et.al., 2014)

## **2.3. Use of the Internet in Schools**

The use of Internet in the education sector plays a key role in the advancement of education (Munshi, 2014) because information technology plays an important role in every area of life in a society. Since people have realized the value of the Internet, the structure of human life has also shifted, and it has become inseparable from the field of education. In the world of education, the Internet is considered to be a platform in which students can easily access the many tools relevant to the subject they prefer.

The internet usage in schools might also require certain facilities to allow access to certain subjects. Rahardiyana (2013) stated that the use of the Internet begins with the subjects that often use internet facilities during the teaching and learning process. This also means that students need to know and comprehend the internet services available both at school and at home. The

implementation and development of internet infrastructure eventually make students aware of the benefits and drawbacks of the internet. Eventually, many students become Internet users outside school hours or outside school activities. Furthermore, the internet standardization in schools includes the following aspects:

1. Internet is useful as a knowledge medium where students benefit from the Internet as an information medium
2. Internet is useful as a communication medium where students benefit from the Internet as a communication medium
3. Internet is useful as a medium of entertainment
4. Internet is useful as a forum for commerce and business (Rahardiyan, E. (2013).

#### **2.4. Using the Internet at Home**

The results show that, in general, more children are using the Internet at school than at home but the use of internet at home was often perceived as enjoyable (Johnson, 2010). Three Internet usage patterns have emerged suggesting three types of young users: home-based users exhibiting wide, comprehensive, and pleasant Internet use at home coupled with limited and unpleasant Internet use at school; school-oriented information seekers reported mainly visiting websites, both at home and at school, but school access was preferred, and school-oriented communicators indicated primarily using email, both at home and at school, but school use was preferred, and school-oriented communicators suggested mainly by e-mail, both at home and at school, but school use was favored.

Internet use and home habits are valued differently for families of diverse learning backgrounds (Hunsaker & Hargittai, 2018; Scheerder et.al., 2019). Those with higher education have a critical view of the Internet while less educated participants appear to be less interested in Internet innovations and, generally, have a less optimistic attitude. However, the use of the internet at home is also affected by age. Hunsaker & Hargittai (2018) found that internet usage among older adults continues to increase over time. In the United States, only 12% of people aged 65 overused the Internet in 2000. The percentage has increased to 22% in 2004, 38% in 2008, 53% in 2012, and 67% in 2016 (Anderson & Perrin, 2017; Fox, 2004; Zickuhr & Madden, 2012). Internet is also used for e-learning from home (Muthy & Pujiastuti, 2020). In the study, it is revealed that in e-learning-based learning, teachers use the learning process to improve information, skills, and character in accordance with 21st-century skills. Students must have 4C skills, namely creativity, critical thinking, communication and collaboration. In addition, the use of the internet at home offers some benefits including the availability of learning media applications using e-learning through the use of technology in learning mathematics for students at home (Muthy & Pujiastuti, 2020). In this context, the teacher uses the WhatsApp application to send a notification to students, use Google Classroom as a support and use Google Drive to provide material, assignments, quizzes, and online discussions.

#### **2.5. Supporting Factors for Internet Access in Schools**

The Internet network is a network system that is globally connected to facilitate the communication of files or data services, such as file transfer, e-mail, remote login, newsgroups, and the World Wide Web. In recent times, millions of people around the world have benefitted from the use of internet networks with a variety of different applications. Although the use of Internet networks was limited to academic and military institutions in the past, it is now more widely used. The concept of the internet network, requires special understanding that the network of each computer in the world is somewhat linked to each other.

The purpose of the internet network is to facilitate the delivery of information around the world openly and to facilitate the storage of data or files on other computers which are located in distant locations. The current definition of internet networks can be inferred that it is a system that benefits people's lives through certain devices and aims to enhance the world's technological development without restrictions.

The widely used network is a client server or network model. This model is specifically distinguished by a computer that delivers the service called the server and the computer that

receives the service (client). In order to enable the communication between the server and the client, the server program or software server, and the client program or software client are required. There are three types of typologies that can be used for connecting the server to the client, namely bus typology, ring typology, and star or hub typology. In order to build, operate, and manage the infrastructure, four types of technological components are required, namely client (software and hardware), server (software and hardware), delivery mode, and technical support.

Rahmanadri et.al (2014) stated that searching for the desired information on internet media is easier by using search engines. Search engines are a hosting database of billions of websites from around the world. The search process starts by simply entering a keyword and the search engine will show a range of site links followed by a brief summary (Adri, 2007). In general, the website is divided into a few types. The types of websites used in this analysis are explained as follows:

1. The web search engine is a web portal that has the potential to scan documents based on certain keywords such as Google and Alltheweb.
2. The web portal is a web portal that comprises of a selection of links, search engines, and information such as AOL and Yahoo.
3. Company Web is a web site that explains a company, services, facilities, and everything about the company such as Andi Publisher and Indosat.
4. Weblogs, or often abbreviated as blogs, are websites that encourage users to write something that becomes a user's opinion or a diary or diary view. Internet users who create their own blogs are called bloggers.

Moreover, facilities are something that can be used as a method to accomplish goals or objectives (Indrawan, 2015). Educational facilities are instruments or resources that are used directly and that support the teaching and learning process, such as residences, classrooms, table chairs, instructional materials, and media. [13]. Educational facilities are all facilities required in the teaching and learning process, both mobile and immobile, so the achievement of educational objectives can be smooth, regular, successful, and efficient. It can be inferred from these concepts that educational facilities are all facilities that can directly help the educational process, particularly the teaching and learning process, both mobile and immobile, and also enables the achievement of educational objectives to be smooth, routine, productive, and successful.

Facilities and infrastructure are key factors in the advancement of education, along with the growth of science and technology and also the internet-based activities are a crucial part of the process. (Indrawan, 2015; Gershberg, 2014). The technology is therefore something that must be made fully accessible and must comply with the minimum requirements necessary, whether it is pertaining to equipment, facilities, service, or maintenance. Ideally, by using the internet to study at school, there should be a number of computers that one may use to access the internet. It would be much better if the computers linked to the internet are located in a special location, such as in a computer lab or at another strategic space. This is intended to make internet access for teachers and students be easier (Gershberg, 2014)

With network availability, only one connection is required for the internet to be shared by the computers integrated into the network. One of the most important aspects of a network and connection to the internet for learning purposes is its reliability so it can be used 24 hours with a minimum amount of interruption or malfunction (Van den Blink, 2015).

Computer laboratories are classrooms equipped with computer facilities, internet networks, and hotspots or wireless devices that are used for ICT learning for students and teachers, as well as for staff interested in learning. A computer laboratory is a facility built to be an optimal learning space. The computer lab supports the infrastructure and design or features that teaching technology tools need to improve the efficacy of teaching and learning in students. (Van den Blink, 2015). Using a computer laboratory for learning can take the form of training in ICT operations, expanding the use of ICT, and other uses. Thus, the commitment of students, teachers and educational personnel to work and use ICTs in accordance with the specifications of the task and times can be fulfilled. fore, this article discussed the Internet usage which is supposed to facilitate learning improvement for vocational secondary school teachers during the COVID-19, as identified from the use of internet access in school and at home, and also the availability of internet access as a learning resource for vocational secondary school teachers. The purpose of this study is to evaluate the Internet usage of

vocational school teachers and their access to the Internet in order to find teaching resources before and during the COVID-19.

### 3. Method

The research method used was a survey using a quantitative approach. This study was performed before and after the COVID-19 pandemic from March to September 2020. Respondents in this study were 267 active vocational teachers in West Java.

The research instrument consists of two elements. The first element relates to the use of the Internet by vocational teachers in producing learning materials, searching for subject content, networking with productive teachers, having discussions with productive teachers, finding out the success of vocational schools worldwide, the pursuing for learning opportunities and learning through videos and learning methods for vocational students. The second element of research instrument is the frequency of internet access for vocational school teachers for internet access at home and school as well as the availability of ICT devices in accessing the internet, both owned by schools and the teachers.

The data in this study are primary data collected from 267 respondents. Respondents in this study were selected using simple random sampling with 23 statements presented in an online questionnaire as a means of collecting data.

### 4. Results and Discussion

#### 4.1. Vocational School Teachers Internet Usage

Based on the results of a survey distributed to 267 productive vocational school teachers in West Java who became the subjects of this study, an overview of productive teachers' ICT literacy in using the internet at schools, internet access at school and at home, the motivation of productive vocational teachers in accessing the Internet, frequency of internet usage, ICT infrastructure at vocational schools or owned by teachers, ICT training frequency and the ICT training costs were obtained and explained as follows:

The use of the Internet in schools as support for the learning process, such as the quest for learning materials, subject matter, the creation of networks of active teachers, the review of the development of vocational training, the quest for training opportunities, and the search for learning methods at vocational schools several things can be seen in Figure 1.

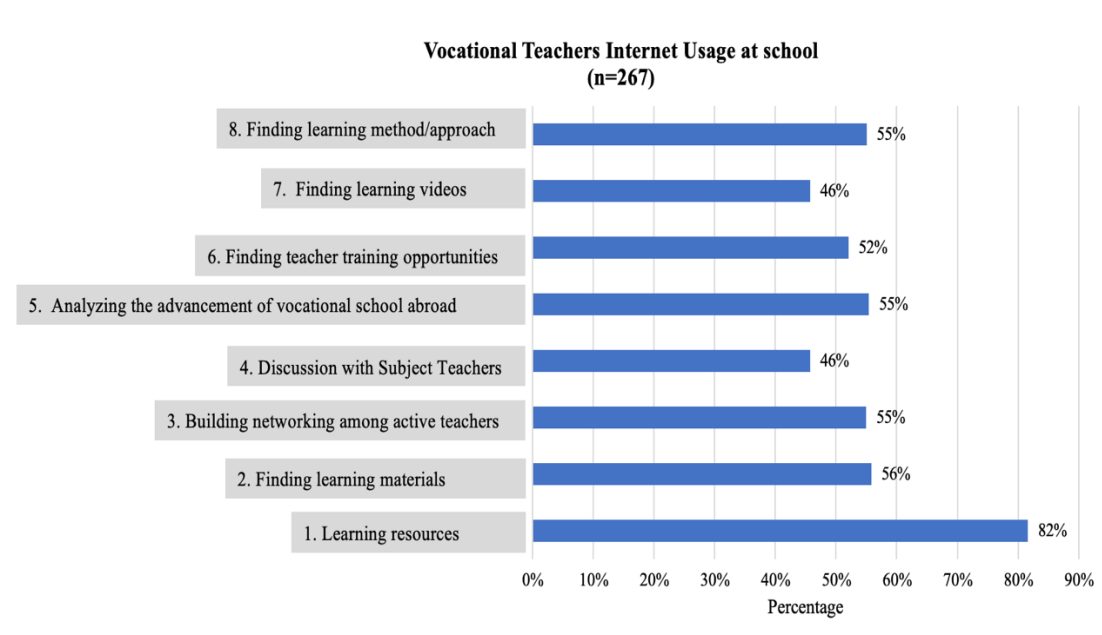


Figure1. Vocational School Teachers Internet Usage at School

Based on Figure 1, it can be seen that the use of the internet in schools by vocational teachers is as follows:

1. 82% use internet at schools to find learning resources such as looking for references related to subjects, applications or software in certain subjects and the management of online learning.
2. 56% search for subject matter or teaching material due to limited resources at school and many topics to be covered during teaching were not well understood.
3. 55% use the internet to have virtual connections with other productive teachers, to examine the progress of vocational learning abroad, and to look for methods or approaches of vocational learning.
4. 52% use the internet at school to find opportunities for vocational learning training.
5. 46% use the internet at school for discussions and sharing experiences in the learning process with Group of Subject Teachers from other vocational schools.
6. 46% use the internet at school to look for subject-related materials through animation media or learning videos downloaded through the YouTube channel.

#### 4.2. Frequency of Internet Use at School and Home

The frequency of vocational teachers' internet use is related to the duration the teachers spent to access the internet both at school and at home to search for subject-related materials and others. The following research findings on the vocational school teachers' frequency of internet usage at schools and at home before the COVID- 19 pandemic can be seen in Figures 2 and 3.

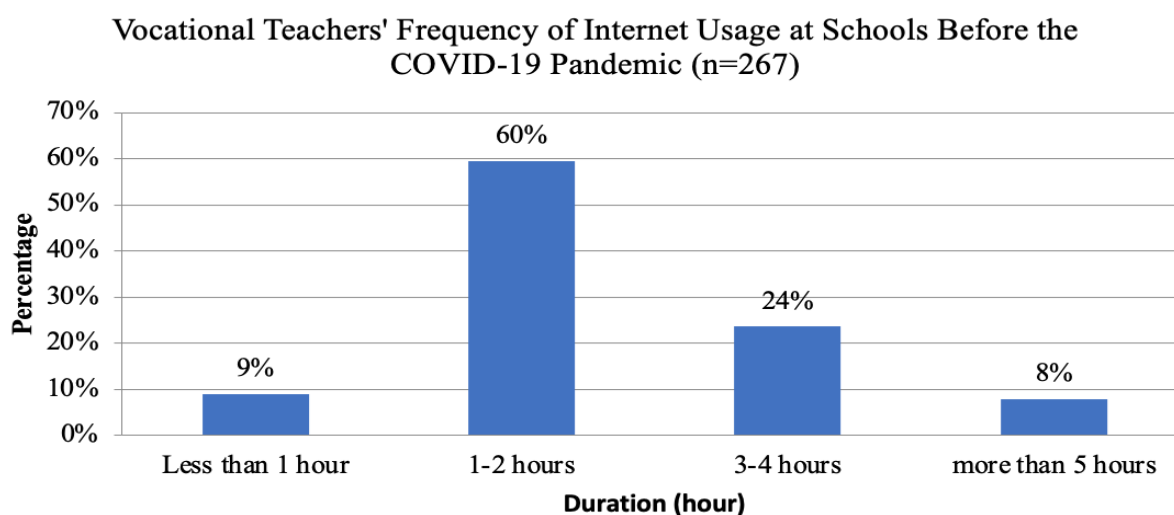


Figure 2. Vocational Teachers Frequency of Internet Usage at School before the COVID-19 Pandemic

In Figure 2, it is found that the frequency of internet use by vocational school teachers at home before the COVID-19 pandemic showed that 46% of teachers relatively accessed the internet at home for 1-2 hours. There were at least 9% of teachers who accessed the internet for less than 1 hour. Furthermore, research findings on the frequency of teachers' internet use at schools and at home during the COVID-19 pandemic can be seen in Figures 3 and 4.

Vocational Teachers Frequency of Internet Usage at School during the COVID-19 Pandemic (n=267)

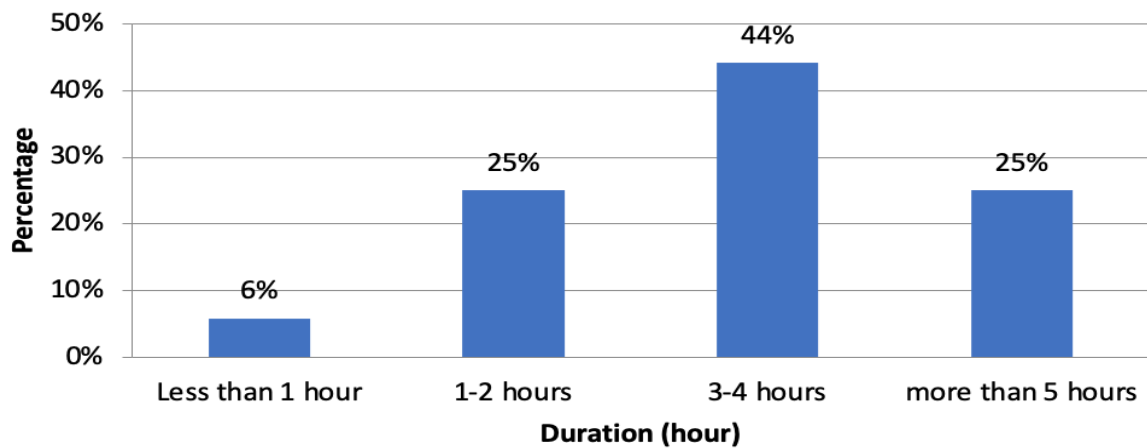


Figure 3. Vocational Teachers Frequency of Internet Usage at School during the COVID-19 Pandemic

Figure 3 shows that in general vocational school teachers accessed the internet at school during the COVID-19 pandemic. 44% of the vocational school teachers accessed the internet for 3-4 hours and at least 6% accessed the internet for less than 1 hour. Meanwhile, the teachers' frequency of using the internet to access the internet at home during the COVID-19 pandemic to search for subject matter, and others can be seen in Figure 4.

Vocational Teachers Frequency of Internet Usage at Home during the COVID-19 Pandemic (n=267)

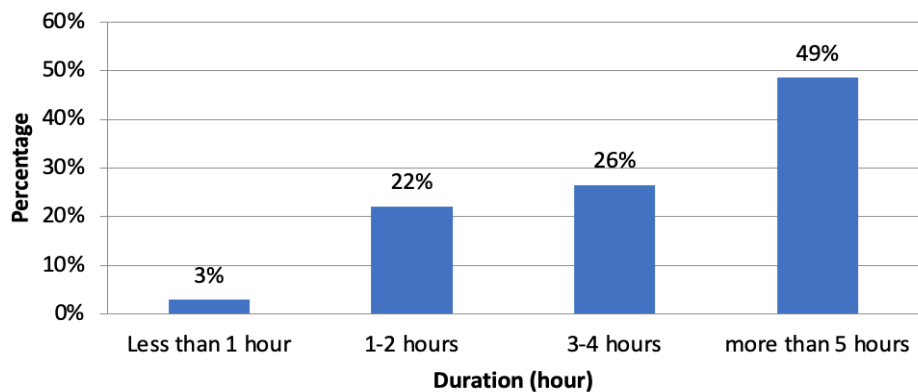


Figure 4. Vocational Teachers Frequency of Internet Usage at Home during the COVID-19 Pandemic

Figure 4 displays the frequency of the internet usage of vocational school teachers at home during COVID-19. It was found that as many as 49% of vocational school teachers accessed the internet at home for approximately more than 5 hours on average. At least 3% of vocational school teachers accessed the internet at home for less than 1 hour. The comparison of Internet use before and during COVID-19 at school and at home can be seen in Table 1.



Table 1. Comparison of Internet Usage Frequency Before and during COVID-19 at School and at Home

Frequency	At home		At School	
	Before COVID-19	During COVID-19	Before COVID-19	During COVID-19
Less than 1 hour	9%	3%	9%	6%
1-2 hour	46%	22%	60%	25%
3-4 hour	33%	26%	24%	44%
More than 5 hours	13%	49%	8%	25%

From Table 4.1, it can be seen that the frequency of internet use during the COVID-19 pandemic was higher than before the COVID-19 pandemic. Vocational school teachers who used the internet for more than 5 hours at home were 49% and before COVID-19, 46% of teachers used the internet for 1 -2 hours. Additionally, 44% of vocational school teachers used the internet during the COVID-19 pandemic longer than before the COVID-19 pandemic (60%), which was around 1-2 hours.

#### 4.3. Availability of Internet Facilities at Vocational School

The availability of the internet in the vocational school in this survey was related to internet networks in schools, teleconference facilities, internet access in the vocational laboratory or vocational workshops, classrooms, canteens, and other facilities. The following survey findings are presented in Figure 5.

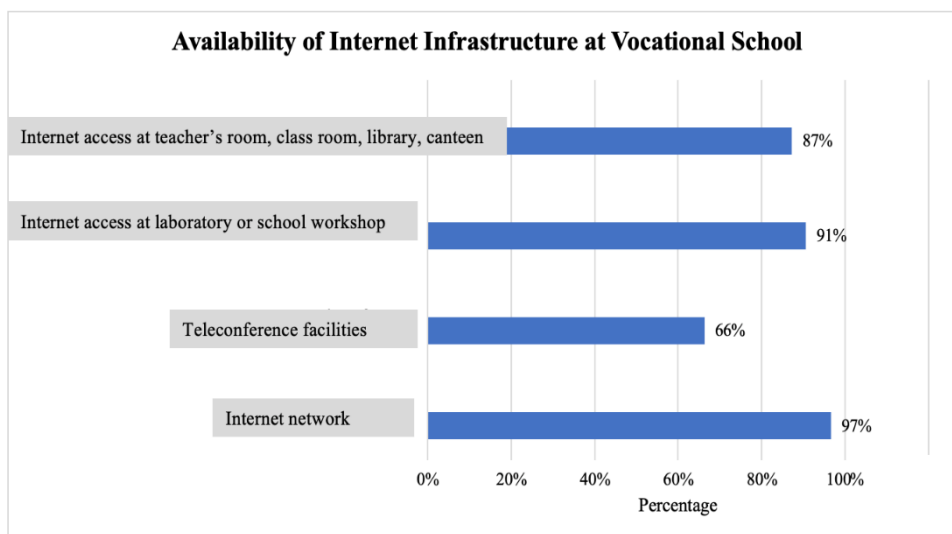


Figure 5: Availability of Internet Infrastructure at Vocational School

From Figure 5, it can be seen that the results of a survey towards teachers stated that 97% of vocational schools already possessed an internet network. At 91% of the vocational schools, it was found that the Internet could be accessed in the vocational laboratory or vocational workshops. Meanwhile, 87% of vocational schools and 66% of vocational schools have internet access in the teacher's room, library, canteen, classrooms and have teleconferencing facilities such as Zoom Meeting application or WebEx. Thus, the availability of internet access at vocational schools is expected to provide opportunities for teachers to gather a lot of information, so that teachers could easily get actual, up to date and relatively faster information. Also, finding references to the subject matter and sharing information with peers and other colleagues.

#### 4.4. ICT Facilities of Vocational School Teacher

The development of ICT has transformed our society with unlimited amount of information and a growing number of tools. Overall, the description of ICT equipment owned by productive vocational teachers is presented in Figure 6.

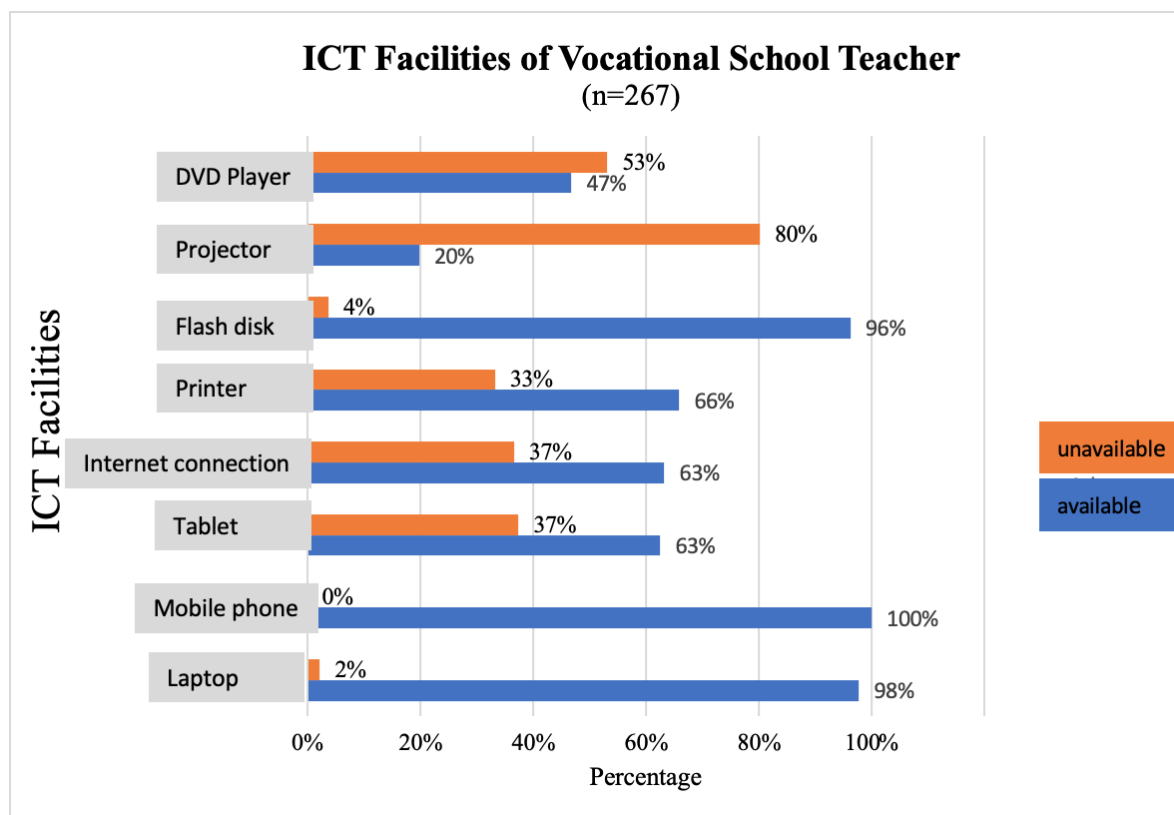


Figure 6. ICT Facilities of Vocational School Teacher

In Figure 6 the findings from the survey results on the availability of ICT devices for Productive Vocational Teachers in supporting ICT literacy show that all (100%) vocational teachers owned mobile phones. Furthermore, 98% of teachers had laptops or computers. 96% of the teachers had flash drives for data storage. On the other hand, only 20% of teachers had an LCD projector and 47% of teachers had a DVD player. In addition, 66% of teachers owned a printer at home and as many as 63% of teachers had tablets and 63% of teachers had internet networks at home.

When teachers have ICT tools, it has a big impact on the ability to use ICT in the learning process in the classroom. In addition, it is important for teachers to improve their skills in using ICT tools through ICT training to enhance the competencies of 21st-century teachers. However, vocational teachers face great challenges because they play a role in preparing human resources with global competitiveness in the aspect of employment. Optimizing the increase in ICT literacy for vocational teachers must be balanced with the availability of infrastructure and motivation. The availability of infrastructures such as the availability of computers and internet access both at school and at home.

#### 5. Conclusion

The advancement of the Internet is very significant and has affected the education sector. Besides being used by the community in general, Internet is commonly used by vocational school teachers. The use of the internet by vocational teachers has an impact on the availability of facilities owned by teachers and schools. In this study, it was found that 97% of vocational teachers in West Java have already had Internet networks and 66% had teleconferencing facilities. COVID-19 has affected teachers' frequency in accessing the internet both at school and at home. 82% of teachers used the internet to find the subject-related resources, 66% had teleconferencing facilities,

63% had already had internet connections at home. Furthermore, teacher's internet usage frequency during the COVID-19 pandemic was higher than before COVID-19. Teachers who work from home used the internet longer during the COVID-19 pandemic; more than 5 hours a day, compared to pre-COVID-19; which was 1-2 hours. Teachers who work from school also used the internet 3-4 hours longer during the COVID-19 than before the COVID-19, which was around 1-2 hours..

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