Digital Divide on Teachers in Online Learning during COVID-19 Pandemic and Its Impacts: Students' Perceptions

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Abstract

Online learning during Covid-19 pandemic becomes an unavoidable choice for schools in carrying out teaching learning activities. The readiness of teachers to teach and the students to learn independently has important role in making the online learning successful. Supporting infrastructure also has a significant role in supporting the success of online learning, such as computer, smartphone, and internet connection. The purpose of this research is to propose an ideal online learning model by taking into account variables such as support and feedback, as well as the digital divide of the teachers. This research involved 719 high school students in Indonesia. Structural Equation Modeling (SEM) is used to empirically validate the success model of online learning at the high school level. The result of this study indicate that school support and feedback still need to be improved. Students are also not fully able to learn independently so they still need to be supported by facilities, infrastructure and motivation from all parties in order the students' performances can be improved.

Keyword: *E-learning, school Support, Self-Learning, Digital divide*

I. Introduction

COVID-19 outbreak in Indonesia and the mass quarantine policy followed by the school closures were experienced by almost all students in Indonesia. In February 2020 WHO declared a global emergency situation related to COVID-19 (WHO report 2020). Based on that report, the Indonesian government made a policy to stop the face-to-face learning activity and implemented a policy of learning from home through online learning. Data from Ministry of Education and Culture in April 2020 stated that there were at least 58.729.037 students who studied from home at the beginning of the COVID-19 pandemic.

The policy of closing schools and being replaced by online learning makes students, especially those who are in their final year of study become worried. Research result of *youngminds* (2020) a non-profit organization that focuses on mental health stated that online learning can cause symptoms of anxiety and is positively correlated with increased concern about academic procrastination. It can happen because the pandemic has eliminated the routine and limited the social interaction so that students experience sudden changes in their study habits.

Online learning on this pandemic period of course then causes debate and discussion about many things, including whether online education can replace the offline education properly, whether students and teachers will get high workload, whether home is an appropriate learning environment, and the extent to which students and teachers can access the internet, and the extent to which online learning is effective, and many more. The pandemic thus has made a change from our paradigm structure to school institutions and the learning process or from offline education to online education.

One of the main topics that emerged in the discussion of online learning in Indonesia is the digital divide. It is a problem arising due to the uneven development of information and communication technology. Ariyanti explained that there are four factors that cause the digital divide, namely infrastructure, skills, language content, and the lack of efficient use of the internet (Oktavianoor, 2020). We can then summarize this digital divide into three groups of problems, namely (1) uneven digital infrastructure related to Indonesia's broad demographic and its complexity. (2) The ability of users, both teachers and students in using the internet with all its complexities in learning. Then (3) problems related to the internet and digital media as the main tools in online learning. These three main problems of the digital divide in online learning are often the focus of discussion in studies related to online learning and its impacts.

The issue of digital divide in Indonesia is directly proportional to the reality of the data facts that Indonesia is ranked 76th in terms of digital readiness in the Southeast Asia region. The value of technological readiness is 41.56 and the readiness of the human resources with a value of 34.77 and it makes Indonesia is below Philippine (Iswara; 2020).

This fact further stimulates the problem of the digital divide, especially online learning during the pandemic. Researchers related to the digital gap in online learning in Indonesia during the COVID-19 pandemic were also produced including research by Oktavianoor who discussed the Gidgital Gap caused by Demographic Condition among Rural Society (2020). The research is a descriptive research focused on seeing how the digital divide is caused by Indonesia's demographic condition. The result of the research showed that there is a relationship between a person's last educational levels with his/her skills in operating search engines and there is a relationship between person's last educational level with his/her ability to understand English content.

Another research is from Muhajir (2020) regarding Online Learning in the COVID-19 era: Digital Gap, Competition System, and Humane Education Model. The result of his research explains the need for equitable distribution of telecommunication infrastructure, solve economic disparities, and evaluate the competition system in education which is always discriminatory and only benefits some people, then regarding the need for a more humane education model. The third research is from Tahir and Darwis (2021) discussing the independent learning and online learning in universities. Their research stated that 61.12 % students can provide feedback when asked questions by their lecturers. 60.14% of students can complete the task well. Then 50.22% of students can process learning materials in an integrated manner. The results of those several studies mentioned above showed that research on online learning has a wide range of discussions so that it is open for researchers to discuss further with other variables with different categories of education levels.

One of the crucial levels of education in Indonesia is at senior high school level. This state is an important phase. Because in this phase students are not only experiencing psychological development and independent learning, but also they are experiencing the pressure to enter college phase and the world of work.

Data released by the Ministry of Education and Culture states that 11.3 million students at the high school level and the equivalent carry out online learning (Pusparisa, 2020). This large number shows that 11.3 million high school students are facing a problem of digital divide. If in the previous studies the focuses are more on how the problems faced by online learning, this research intends to identify the extent to which the effectiveness of online learning has taken place. The main focus of this research is to provide insight regarding students' perceptions of teachers' readiness as a major component in the learning process. The result of this research is expected to provide an overview of the digital divide in Indonesia at the high school level, so that compatible online learning models can emerge at the senior high school level.

II. Theoretical Review

2.1. Definition of E-Learning

Learning using electronic media that widely known as e-learning is a learning cycle that uses the web as a learning framework. Lawless (2018) states e-learning is the delivery of learning and training through digital resources. Although eLearning delivery process is provided through electronic devices such as computers, tablets, and even cell phones connected to the internet, the basis of learning is still the same as formal learning. However, eLearning makes it easy for users to learn anytime, anywhere.

2.2 Basis of online learning in Indonesian schools:

The Minister of Education and Culture of the Republic of Indonesia issued Circular Letter Number 4 of 2020 concerning the Implementation of Education Policies in the Emergency Period for the Spread of Coronavirus Disease (Covid-19) point 2, namely the learning process from home, carried out with the following conditions:

a. Learning from home through online learning is carried out to provide a meaningful learning experience for students, without being burdened with the demands of completing all curriculum achievements for grade promotion and graduation;
b. Learning from home can be focused on life skills education, including regarding the Covid-19 pandemic;
c. Learning from home activities and tasks may vary between students, according to their individual interests and conditions, including taking into account the gaps in access and learning facilities at home;
d. Evidence or products of learning activities from home are given qualitative and useful feedback from the teacher, without being required to give quantitative scores/values.

2.3 Types of E-learning

Oliveira et al (2018) describe the types of e-learning, namely:

Simultaneous Delivery

In this type, teachers and students in different educational institutions such as universities, institutes and schools, communicate and interact directly at any time in real time.
This mode can also be referred to as synchronous and can be used to conduct distance learning and multiple training courses.

Asynchronous Delivery

In this type, the teacher makes the learning material available on videotapes, or transfers the content via a computer or other means. Meanwhile, teaching participants (recipients) from other parties receive material at another time that is suitable and appropriate for them.

2.4. Elements of Online Learning

To begin with, online learning requires the availability of the internet in order to facilitate communication with students or learners who are present and responsible for tracking everything related to educational materials. Specially designed sites and portals following appropriate mechanisms can be used to achieve goals. These sites and portals should explain the material in a comprehensive way so that it can be useful. Discussion forums, either directly or indirectly, can also be provided for teachers and students. Finally, teachers who are given responsibility for monitoring and evaluating student performance must be available and must provide grades to students.

2.5. Methods of Online Learning

There are many methods of online learning, and each of these methods targets a specific stage of educational interaction during the development of online learning. The development of information and communication technology takes place very rapidly. This development and evolution are reflected in the developing use of education. New and more effective online learning methods are being used (Zawacki-Richter et al, 2009; Burns, 2011).

The most proven methods for online learning are:

A. Multimedia Style:
This method is based on written communication. Learners make use of written material provided to them through audio and video recordings on CDs or telephone and radio broadcasts. Educational references, study guides and systematic books are printed and given to students. The multimedia style can be adopted not only to support online learning on its own, but also provide substantial support for other methods as well.

B. Video Conference Method:

As stated by Motamedi (2001), this method is the same as learning that occurs in traditional classrooms. However, students are geographically far from their teachers and classmates, yet they are connected through high-speed communication channels. Everyone can see and hear the teacher. They can ask questions directly. They can actively participate in a discussion and can interact with the topics presented by the teacher. However, to make sure that everything goes well and according to the plan, the video conference method requires prior planning and preparation and takes longer than traditional classroom lectures. It also demands scientific materials and media. Teachers must be trained to attract students' attention and interest. These are the prerequisites for making effective use of this technology.

2.6 Digital Divide

The digital divide is a problem that occurs in society, causing inequality and differences that result in imbalance. Digital divide has the meaning as the gap between individuals, gender, age, socioeconomic, group of people and different geographic areas and economic in accessing information technology (information and communication technologies / ICT) and communication in using the internet for various activities in an unlimited time. The digital divide reflects various gaps in its utilization within a country or between countries. Technological developments have influenced various arrangements of people's lives. This digital divide creates new gaps in society or even worsen the existing gaps, especially in developing countries or relatively underdeveloped areas. If the division is towards groups, this digital divide can be related to socio-economic differences for example between the rich and the poor. If it is towards generation, the example is between the old and the young and if it is the geographical layout, the example is urban or rural. According to the ILO (2001, 1) the digital divide is defined as follows: The latest World Employment Report finds that, given its different speed of diffusion in wealthy and poor countries, the information and communications technology (ICT) revolution is resulting in a widening global "digital divide".
Based on the definition, it can be concluded that inequality does not only occur at the business and geographic level, but also includes inequality at the socioeconomic level.

According to Shana and Hacker (2003) in Yayat D. Hadiyat (2014), the communication scientists argue that there are many advantages that can be obtained if people use ICT so that it will be a problem if many people are not touched by ICT either due to the socioeconomic level or because of the lack of access and use.

Meanwhile, according to Syopiansyah Jaya Putra (2009) digital divide is a world that is divided between people who can and cannot interconnect or do not have the ability to use the information technologies, such as telephone, television, the internet, etc. Digital divide occurs within big and small cities as well as in remote areas with very limited access to the information technology.

Based on the three opinions above, Digital divide is regarded as a serious problem that causes differences or gaps in obtaining information or in information literacy in terms of opportunities for information and communication technology accessibility for various activities due to differences in educational background, gender, age, geographic area, social status, economy, and also the place of work. So, digital divide in other words is an inequality in the use of internet access and the use of ICT infrastructure which refers to individual opportunities to increase productivity of the individuals.

III. Methods

3.1. Type of research

This research is a quantitative research. The quantitative research method is based on the philosophy of positivism and is used to examine certain populations or samples with the sampling techniques generally carried out randomly, using certain research instruments for the data collection, and with a quantitative/statistical data analysis aiming to test the established hypothesis. (Sugiyono, 2006:14).

3.2. Population, Research Sample, and Sampling Technique

The population is a generalization area consisting of objects/subjects with certain numbers and characteristics determined by the researcher to be studied further and draw conclusions afterwards (Sugiyono, 1997:57). Meanwhile, a sample is a subset of a population which provides a true representation of the population. (Gulo, 2010:78).

The population in this study was a group of high school students throughout Indonesia. The processable data of this research which were obtained from respondents were 719. While the sampling technique used in this study was purposive sampling technique, which is one of the non-random sampling techniques where the researcher determines the samples by determining certain/special characteristics of the samples in accordance with the research objectives to answer the research problems.

3.3. Data Collection Method and Source of the Data

In order to obtain objective and scientifically justifiable data, a data collection method which can reveal data in accordance with the subject matter is needed. Suharsimi Arikunto (2002: 127), explains that the types of methods and instruments of data collection are like talking about evaluation.

Evaluating is obtaining data about the status of something compared to a predetermined standard or measure. From this understanding, the types of research methods and research tools are all, or at least almost all of them, the same. Broadly speaking, the evaluation tools used can be classified into two types, namely test and non-test tools. In this research, the method used was a test. According to Suharsimi Arikunto (2002: 127), a test is a series of questions used to measure something, which in this research was used to measure the effectiveness of online learning.

The source of the data used is primary data, namely the data obtained from the source directly by using a questionnaire instrument, which has passed the validity and reliability test stage. The questionnaires were distributed in the time span between April and June 2020. The preparation of the questionnaire used a Likert scale method with a scale of 1 – 7, starting from 1 (the smallest value) for respondents who considered each statement item having low value, and 7 (the largest value) for respondents who considered each statement item having high value.

The preparation of the questionnaire material used as the research instrument was based on empirical studies of several previous researches. The determination of indicators in this research questionnaire is a modification (addition, subtraction and adjustment) of several studies of stress

symptoms at the psychosocial symptom stage, which include: anxiety, irritability, self-restraint, moody, being easily offended, apathy, depression, quick thinking response, helplessness, and assumptions about the severity of learning using a full online system.

IV. Discussion

This section elaborates the discussion of the research. The first section discussed the demographics of the respondents. This will be followed by the digital divide of the teachers based on students' perception during the implementation of online learning due to Covid-19 outbreak.

4.1. Respondent Demographics

The following is the demographics of the respondents (students), respectively, based on gender, and school area of origin (java and outside Java).

a. Based on gender

Table 1. Respondents by Gender

Gender	Total	%
Female	423	59
Male	296	41
Total	719	100%

Based on the data acquired, the composition of respondents was 423 female students or 59%, while the rest 296 or 41% respondents are male students. It can be concluded that the respondents are dominated by women.

b. Based on School Location (Java and outside Java)

Table 2. Respondents by School Area

School Origin	Total	%
Java	556	78
Outide Java	163	22
Total	719	100%

From the data, it was found that the largest number of respondents was from Java which are 556 students or 78 while the rest respondents came from outside Java. They are 163 students or 22%.

c. Based on School Status (State or Private)

Table 3. Respondents by School Origin (State or Private)

State/ Private	Total	%
State	478	67
Private	241	32

Total	719	100%

From the data, respondents from private schools were 241 or 32%, while those from public schools were 478 respondents or 67%. In this case, respondents from public schools were more dominant, but the difference of respondents between the state and private schools did not differ significantly.

Based on the respondents' answers to the questionnaire given, the following data were obtained. The results were then analyzed descriptively as follows:

4.2. Impact of Online Learning on Students

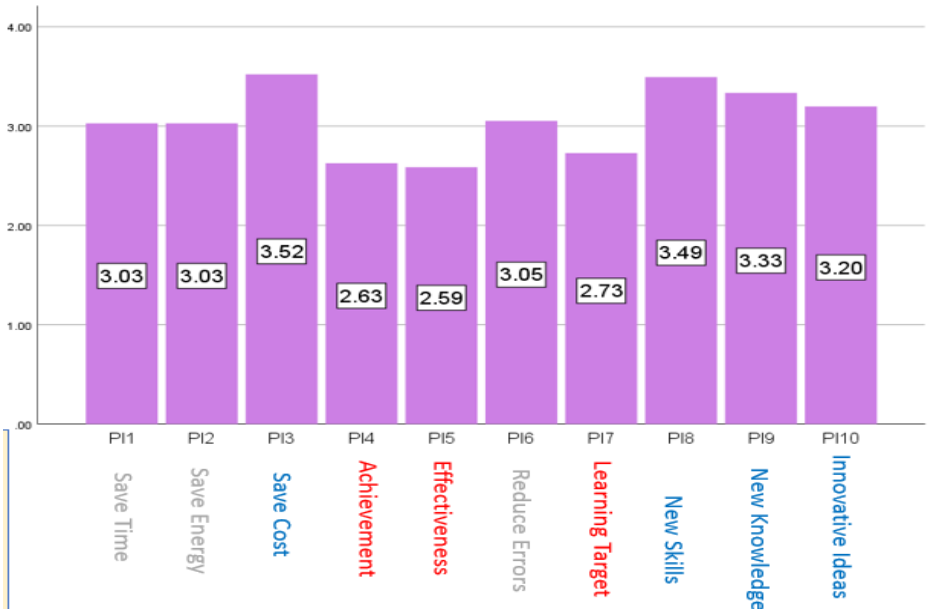


Figure 1. The positive and Negative Impacts of Online Learning on High School Students during the Pandemic outbreak

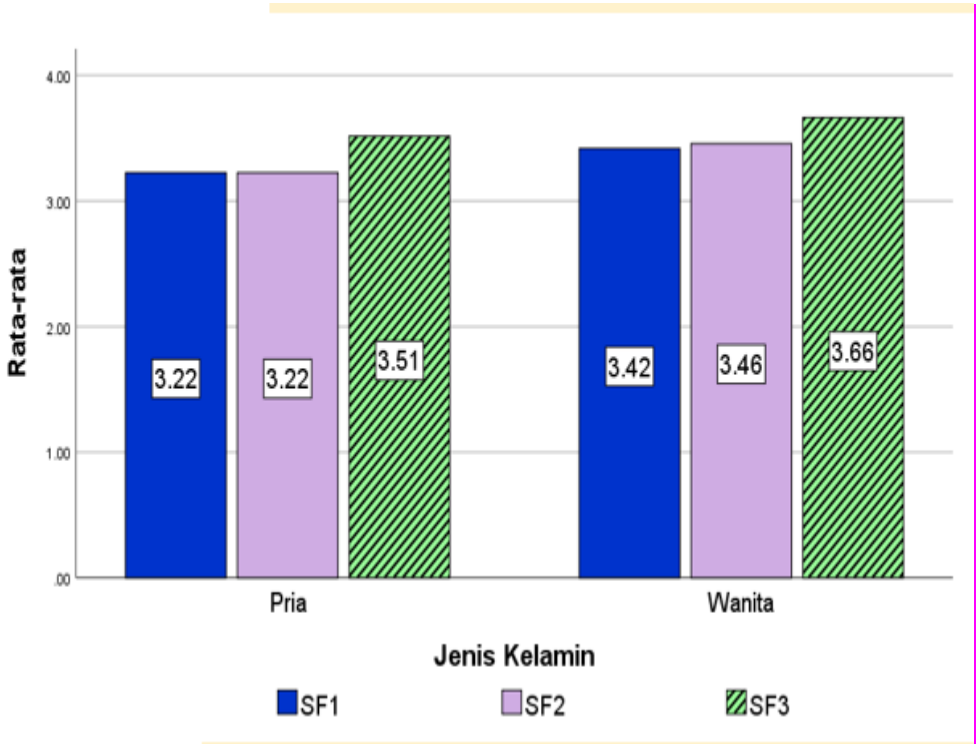
From the answers of 719 high school students from Java and outside Java, both male and female, it was found that the average answer was 3.21. This means that online learning has positive or quite good impacts on student learning outcomes. Out of the ten indicators, seven indicators have a value above 3.00. It shows that learning from home is quite successful. The seven indicators are (1) saving time, (2) saving energy, (3) saving costs, (4) reducing errors, (5) new skills, (6) new knowledge, (7) creative ideas. Based on respondents' answers, it can be concluded that learning from home due to the COVID-19 pandemic has positive impacts, such as students become more innovative, their skills and knowledge increase, errors in answering questions are reduced, cost-

effective because they do not leave the house to go to school or campus, more energy-efficient, and time-saving.

The three indicators with answers below 3.00 on a Likert scale are (1) learning targets, the average answer is 2.73; (2) Effectiveness, the average answer is 2.69; (3) Achievement, the average answer is 2.65. Based on the average of these three indicators, it can be concluded that learning from home during this pandemic has negative impacts, namely reduced learning targets, less effectiveness, and decreased achievement.

4.3. Teacher Support

a. Based on the Perceptions of Male and Female Students

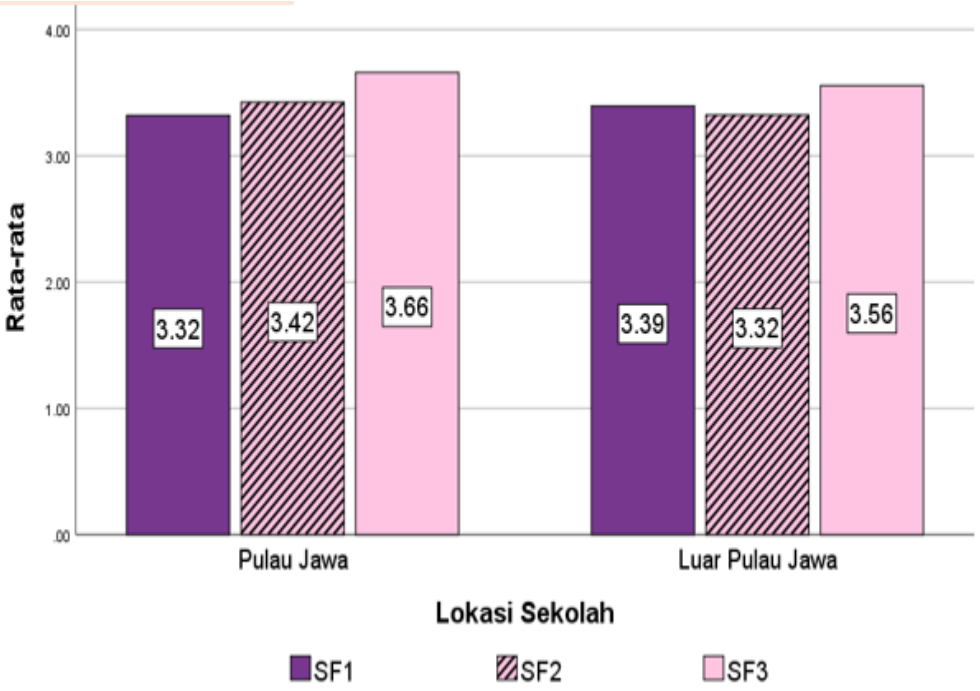


SF1: Ability to manage online learning; SF2: ICT Competence; SF3: Positive attitude in using ICT

Figure 2. Student perceptions of teacher readiness in online learning based on gender (male and female)

Based on students' answers related to teacher readiness in online learning by gender, researchers have described in graphical form as shown in Figure 2. In the figure, it can be explained that teachers have sufficient ICT knowledge in managing online classes. There is no significant difference in students' perceptions of readiness in online learning. This is indicated by the average answer of male students namely 3.41 on a Likert scale and, the average answer of female students is 3.51. All indicators show values above 3.00. The indicators are (1) the ability to manage online learning, (2) ICT competence, (3) a positive attitude in the use of ICT. These abilities still need to be improved so that the implementation of online teaching and learning can run more optimally.

b. Based on geographical location of the school



SF1: Online Learning Management Ability; SF2: ICT Competence; SF3: Positive Attitude in Using ICT

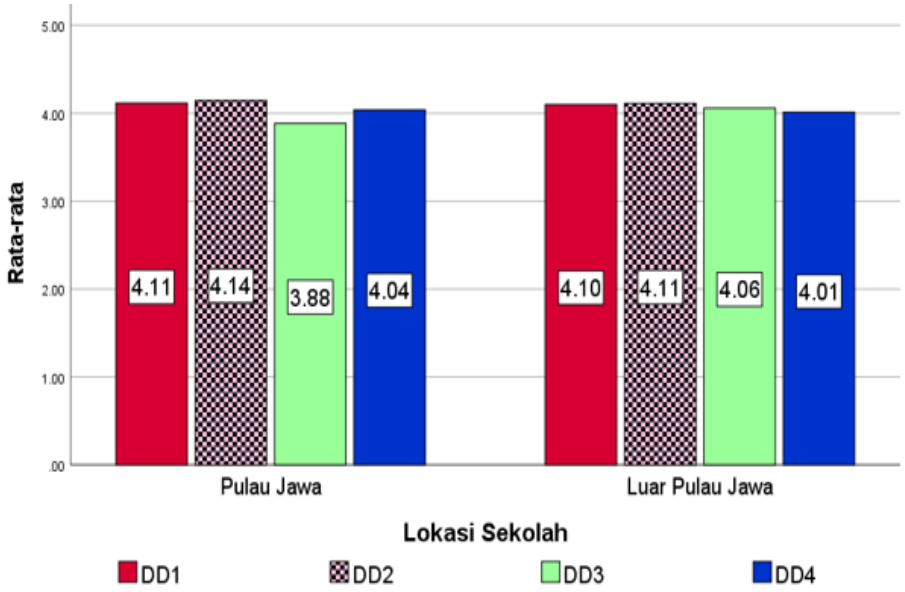
Figure 3. The students' perceptions of teacher readiness in online learning based on school location (Java and outside Java)

Based on the students' answers related to teacher readiness in online learning based on school location, the researchers have described in graphical form which can be seen in Figure 3. In the figure, it can be explained that teachers had sufficient ICT knowledge in managing online classes. There is no significant difference in students' perceptions of online learning preparation. It is indicated by the average answer of students in Java is 3.51 on a Likert scale and the average answer of students outside Java is 3.49. All indicators showed above 3.00. The indicators are (1) online learning management ability; (2) ICT competence; (3) Positive

attitude in using ICT. However, the ability still needs to be improved thus the implementation of online teaching and learning runs more optimal.

4.4. Digital Divide

a. Based on geographical location of the school



DD1: Internet cost; DD2: device price; DD3: connection quality; DD4: budget portion of SFH

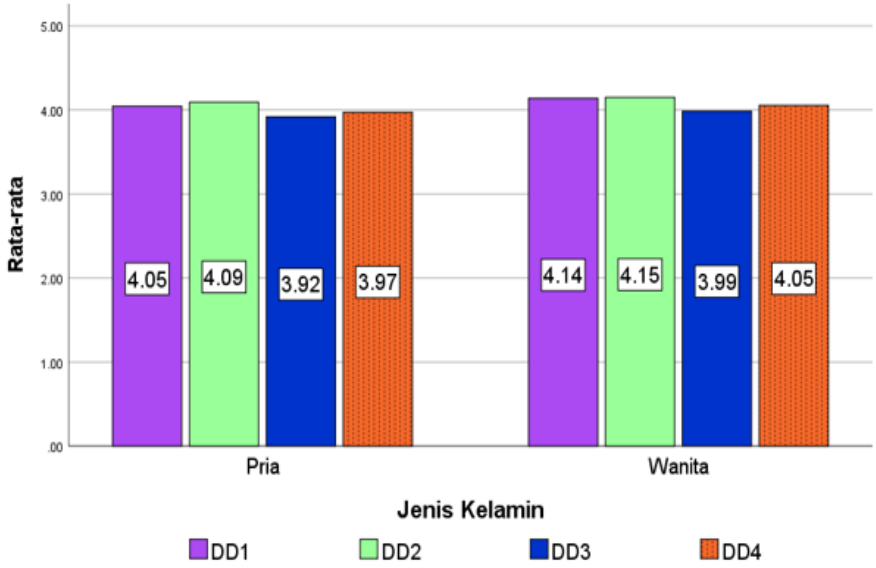
Figure 4. Digital Divide of the Teachers based on students' perception (Java and outside Java)

To figure out the digital divide faced by teachers, the researchers used 4 indicators, namely 1) Internet cost, 2) Device price, 3) Connection quality, 4) budget portion of SFH. Based on the students' answers, it was found that there was no significant difference in students' perceptions of teachers in terms of the digital divide.

In Figure 4, it can be seen that 1) internet cost: with the average answer for students from Java 4.11 and from outside Java 4.10, they answered that internet quota is expensive. Internet quota is an important tool in online learning. Meanwhile, the cost is still too high for the teachers. It can hinder the online teaching and learning process; 2) device price: based on the students' perception, the average for teachers from Java is 4.14 and those from outside Java is 4.11, they answered that the device price such as laptops, mobile phones, tablets, desktop computers are still very expensive for them, this is indicated by the average of

students' answers through Likert scale is above 4; 3) connection quality: the average of students' perceptions of teachers in Java is 3.88 and outside Java is 4.06. This shows that the internet connection does not fully support online learning. However, it must be admitted that the internet connection in Java is still relatively more stable than the connection outside Java. 4) Budget portion of SFH: based on the answers of students from Java and outside Java, it can be seen that the average answer is 4.02. This indicates that the budget for this SFH is above 4 on the Likert scale.

a. Based on Respondents' Gender



DD1: Internet Cost; DD2: Device Price; DD3: Connection Quality; DD4: Budget Portion of SFH

Figure 5. Digital Divide of the Teachers based on male and female students' perception

In this section, the researchers wanted to know the digital divide faced by teachers based on students' perceptions of their gender, the researchers used 4 indicators, namely 1) Internet costs, 2) Device prices, 3) Connection quality, 4) Budget portion of SFH. Based on the students' answers, it was found that there was no significant difference in the perceptions of female and male students towards teachers in terms of the digital divide.

The following describes the survey results of male and female students' perceptions based on four indicators. 1) Internet costs: with the average answer for male students 4.05 and for female students 4.14, they answered that internet quota is expensive. Internet quota is an important tool in online learning. Meanwhile the cost is still too high for teachers. This certainly can hinder the online teaching and learning process; 2) device price: the average male student answered 4.09 and the average female student answered 4.15. This shows that device prices such as laptops, mobile phones, tablets, desktop computers are still quite expensive for them. This is indicated by the average Likert scale of student answers above 3 on the Likert scale; 3) connection quality: the average answer of male students regarding this internet connection is 3.92 and female students is

3.99. This shows that internet connection is sufficient to support online learning. However, this still needs to be improved so that the internet connection is relatively more stable; 4) budget portion of SHF: based on the answers of male students that the budget for SFH is 3.09 which means it is quite high and the average answer of female students is 4.05 which means the budget for SFH is higher. This shows that the budget for SFH is quite high (greater than 3 on the Likert scale).

V. Conclusion

During SFH, based on the student perceptions, teacher readiness in evaluating online learning is relatively diverse and teacher readiness in mastering IT is still needed to be improved. Improvement efforts of competence in using IT or digital literacy should be done so that online learning can have a positive impact on student learning outcomes during the pandemic. This happens because according to students' perceptions, not all teachers have adequate competence in using information technology in online learning.

Students found that teachers on average have quite a positive attitude towards online learning during SFH. Teachers' attitudes towards technology may vary, including the use of digital technology during the pandemic. Efforts should be made for teachers to change these attitudes so that the adaptation level of teachers in online learning can increase.

The survey results of students show that there is a relatively prominent gap in support & feedback from teachers between Java and outside Java. This also happens in the digital divide which is still relatively prominent. Therefore, efforts should be made so that teachers can make students, including their parents/families, motivated to learn from home.

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