

# Artificial Intelligence for COVID-19

*by Pps A Lahmi*

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Diego Oliva  
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# Artificial Intelligence for COVID-19

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Editors

# Artificial Intelligence for COVID-19

 Springer

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## Preface

Artificial Intelligence (AI) is an area of science that emphasizes intelligent machines that work and behave like humans. Machines can often act and react like humans only if they have much information relating to the world. AI has become an essential part of technology and represents incredibly exciting and powerful techniques. It is used to solve many real-world problems of growing interdisciplinary interest and practical importance.

This book contains several different types of articles that provide access to the state of AI art. It covers all major areas of the concepts, methods, tools and leading AI results in the domain of recent developments. The information contained in the book explores different areas of AI; machine and deep learning; advanced image processing; computational intelligence; IoT; robotics and automation; optimization; mathematical modelling; neural networks; information technology; big data, data processing; data mining and likewise. We intend to cover the breadth and depth of AI, presenting general overviews of the scientific issues and detailed discussions of techniques and essential system material in AI for real-world applications. The book's overarching purpose is to provide a collected and connected set of reflections about AI and its influences as the field advance. The participants represent diverse specialties, geographic regions and career stages. The included chapters develop theory, algorithms, programs, policies and systems design to ensure that these systems can inspire innovations and provide intelligent advice to government agencies and non-government organizations to combat against COVID-19. The book is a long-term investigation of AI's field and its influences on defending against the COVID-19 pandemic and broadly benefit individuals and society.

The book features a wealth of real applications, case studies and illustrations for COVID-19 emerging pandemic along with the theoretical concepts, algorithms and procedures. With this diversity and interdisciplinary subject matter, we are trying to build bridges that scientists can cross in other fields. These applications cover a wide variety of different specialties that include many diverse directions in the field of combating against COVID-19 like: relation between numbers of handwashing facilities and COVID-19 deaths; big data analysis for COVID-19; data interpretation of COVID-19 cases using R programming; AI applications to COVID-19; ANN

and fuzzy classifier to diagnose COVID-19; QoL barometer for well-being during pandemics; deep and machine learning models for COVID-19; using X-ray images; information and communication technology application in COVID-19 pandemic; robotics and automation for COVID era; COVID-19 machine learning forecasting models; optimization of the international trade activities in COVID-19 period; IoT applications for COVID-19; scheduling disinfection process for COVID-19; forecasting of COVID-19 using SIR; modified SEIR; logistic growth and Holt's models; text mining for COVID-19 analysis; mathematical modelling the spread of COVID-19; information technology in health emergency control; big data in COVID-19 assistance; proactive detection of people infected by COVID-19; online learning problems during COVID-19 period; modelling of population density effect on the infectiousness and mortality rates of COVID-19; AI; chat-bots; solitude; people and a therapeutical blending; prevention guidelines based on cognitively inspired AI and data mining for COVID-19; AI for diagnosis and treatments for COVID-19; factors affecting medical mask purchase decision and Harris hawks optimization for classification of COVID-19 gene.

The book is useful as a valuable reference for AI theoretical and practical professionals because of its comprehensive coverage and a large number of detailed algorithms. It is intended primarily for researchers, decision-makers and practitioners in AI and many application disciplines. It will also be of interest to graduate level for rich case studies and projects.

The editors hope that this book will help the readers share their fascination with Artificial Intelligence and applications. They expect that the proactive guidance stemming from the chapters will have broad global relevance and are making plans for future contributions to expand the scope of the studies.

Finally, we wish to acknowledge the book authors who have made distinguished and fruitful efforts to complete the various chapters of the book. The book contents will enrich the world library in the vital field of Artificial Intelligence with all its multiple specializations and applications.

Guadalajara, Mexico  
Giza, Egypt  
Giza, Egypt  
2021

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# Contents

<b>Simulation of the Relation Between the Number of COVID-19 Death Cases as a Result of the Number of Handwashing Facilities by Using Artificial Intelligence</b> .....	1
Sajedeh Norozpour	
<b>Big Data and Data Analytics for an Enhanced COVID-19 Epidemic Management</b> .....	11
Joseph Bamidele Awotunde, Rasheed Gbenga Jimoh, Idowu Dauda Oladipo, Muyideen Abdulraheem, Taibat Bolanle Jimoh, and Gbemisola Janet Ajamu	
<b>Application of COVID-19 Pandemic Using Artificial Intelligence</b> .....	31
Abhishek Mehta, Trupti Rathod, and Priya R. Swaminarayan	
<b>Application of Artificial Intelligence for COVID-19 Epidemic: An Exploratory Study, Opportunities, Challenges, and Future Prospects</b> .....	47
Joseph Bamidele Awotunde, Sakinat Oluwabukonla Folorunso, Rasheed Gbenga Jimoh, Emmanuel Abidemi Adeniyi, Kazeem Moses Abiodun, and Gbemisola Janet Ajamu	
<b>Diagnosing COVID-19 Virus in the Cardiovascular System Using ANN</b> .....	63
Palanisamy Satheesh Kumar, Jeevitha, and Manikandan	
<b>An Efficient Mixture of Deep and Machine Learning Models for COVID-19 and Tuberculosis Detection Using X-Ray Images in Resource Limited Settings</b> .....	77
Ali H. Al-Timemy, Rami N. Khushaba, Zahraa M. Mosa, and Javier Escudero	

<b>Understanding Role of Information and Communication Technology Application in Vietnam's Prevention and Control of COVID-19 Pandemic</b> .....	101
Nguyen Le Thy Thuong, Thuy T. Dang, and Tran Ngoc Diem	
<b>Robotics and Automation: The Rescuers of COVID Era</b> .....	119
Abhishek Chauhan	
<b>Nonparametric Tests for Comparing COVID-19 Machine Learning Forecasting Models</b> .....	153
Dmitriy Klyushin	
<b>Artificial Intelligence and the Control of COVID-19: A Review of Machine and Deep Learning Approaches</b> .....	167
Sakinat Oluwabukonla Folorunso, Emeka Ogbuju, and Francisca Oladipo	
<b>Optimization of the International Trade Activities in the Period of COVID-19 by Proposing an Algorithm</b> .....	187
Ouail El Imrani, Monsif Ben Messaoud Layti, Salmane Bourekkadi, Abdelhamid Boulaksili, and Issam Kabbassi	
<b>Internet of Things (IoT) and Real Time Applications</b> .....	195
V. Nandalal and V. Anand Kumar	
<b>Optimum Scheduling of the Disinfection Process for COVID-19 in Public Places with a Case Study from Egypt, a Novel Discrete Binary Gaining-Sharing Knowledge-Based Metaheuristic Algorithm</b> .....	215
Said Ali Hassan, Prachi Agrawal, Talari Ganesh, and Ali Wagdy Mohamed	
<b>Predicating COVID19 Epidemic in Nepal Using the SIR Model</b> .....	229
Pawan Thapa	
<b>Feature Extraction of Coronavirus X-Ray Images by RNN, Correlational Networks, and PNN</b> .....	239
V. Kakulapati and Appiah Prince	
<b>Text Mining for Covid-19 Analysis in Latin America</b> .....	257
Josimar Chire Saire and Anabel Pineda-Briseño	
<b>Spread of COVID-19 in Odisha (India) Due to Influx of Migrants and Stability Analysis Using Mathematical Modeling</b> .....	295
Aswin Kumar Rauta, Yerra Shankar Rao, and Jangyadatta Behera	
<b>COVID-19 Epidemic Analysis and Prediction in Virudhunagar District Using Machine Learning</b> .....	311
M. Shanmuga Eswari, N. Indumathi, and R. Ramalakshmi	

<b>Internet of Things and Covid-19 Safety Precautions: Roles of Information Communication Technology in Health Emergency Control for Global Development</b> .....	329
Haruna Ishola Abdullahi, Adeola Latifat Odeniyi, and Sarafadeen Tunde Ganiyu	
<b>Big Data in COVID-19 Assistance—Concepts, Motivations, Advances and Applications in Real-World</b> .....	345
Sukriti Tiwari and Ashwani Kumar	
<b>Two Layer Hybrid Scheme of IMO and PSO for Optimization of Local Aligner: COVID-19 as a Case Study</b> .....	363
Mohamed Issa and Ahmed Helmi	
<b>Intelligent Monitoring System to Aid in the Proactive and Early Detection of People Infected by COVID-19</b> .....	383
Saad Chakkor, Mostafa Baghourri, Ahmed El Oualkadi, Jalil Abdelkader El Hangouche, Jawhar Laamech, and Rachid Belfkih	
<b>Online Learning in the Low Internet Area, Planning, Strategies and Problems Faced by Students During the Covid-19 Period</b> .....	413
Fitria Sartika, Mahyudin Ritonga, Ahmad Lahmi, Aguswan Rasyid, and Suci Ramadhanti Febriani	
<b>Internet of Things (IoT) Enable Designs for Identify and Control the COVID-19 Pandemic</b> .....	423
H. M. K. K. M. B. Herath	
<b>Modelling and Analysis the Population Density Effect on the Infectiousness Rate of COVID-19 Novel Virus and the Mortality Rate Percentage Regarding Oxford's Stringency Index Model of Governmental Response in MATLAB</b> .....	437
Amira Mofreh Ibrahim, Nour El Hoda Mohamed Bishady, Samar Hassan Elghalban, Nagham Nessim Mostafa, Mohab Mohamed Eid, and Khaled Mohamed Abdelhamid	
<b>Forecasting of COVID-19 Using Modified SEIR, Logistic Growth and Holt's Models</b> .....	463
Touka M. A. Mahmoud, Norhan Mohsen ElOcla, Mohamed S. A. Abu-Tafesh, and Ahmed S. A. Mohamed	
<b>An Hybrid Therapeutical Framework Based on Chatbots and Classic Psychotherapy for Mental Issues Raised from the Extended Pandemic Originated by COVID-19</b> .....	489
Estefanía A. Hernández-Carvajal and Danny A. J. Gómez-Ramírez	

<b>Semantic and Morpho-Syntactic Prevention's Guidelines for COVID-19 Based on Cognitively Inspired Artificial Intelligence and Data Mining. Case Study: Europe, North America, and South America</b> .....	501
Yoe A. Herrera-Jaramillo, Danny A. J. Gómez-Ramírez, Johana C. Ortega-Giraldo, and Alex M. Ardila-Garcia	
<b>Applications of Artificial Intelligence and Molecular Immune Pathogenesis, Ongoing Diagnosis and Treatments for COVID-19</b> .....	521
Balendra V. S. Chauhan, Akanksha Jaiswar, Ashish Bedi, Sneha Verma, Vivek Kumar Shrivastaw, and Ajitanshu Vedrtam	
<b>Deep Learning for COVID-19</b> .....	551
Suchandra Dutta, Avishake Adhikary, Dhruvasish Sarkar, Dipak K. Kole, and Premananda Jana	
<b>Factors Affecting Medical Mask Purchase Decision in Covid19 Pandemic</b> .....	567
Bui Huy Khoi, Nguyen Thi Ngan, and Luu Quang Vinh	
<b>Classification Approach for COVID-19 Gene Based on Harris Hawks Optimization</b> .....	575
Essam H. Houssein, Muhammad Ahmad, Mosa E. Hosney, and Manuel Mazzara	

# 1 Online Learning in the Low Internet Area, Planning, Strategies and Problems Faced by Students During the Covid-19 Period



Fitria Sartika, Mahyudin Ritonga, Ahmad Lahmi, Aguswan Rasyid, and Suci Ramadhanti Febriani

**Abstract** • Reveal planning that done in low internet areas in following online learning. • Get information about strategy done by students and college student following the online learning. • Finding problems and offering possible solutions can be a reference for students, college students or teachers in experiencing learning in areas of the low internet. **Objectives:** Areas with low internet need special attention from various parties especially in the condition of covid-19 which require that activities be held online as well as education. Through this research is expected to inform about the planning, strategy as well as the problems faced and solutions offered for the continuity of education in low internet areas. **Method:** This research was conducted in two sub-districts in Solok Regency, West Sumatra, Indonesia, data collection techniques are surveys, and observations, data sources are students and college students and teachers who are at the research location. Data analysis this researcher performed qualitative data analysis procedures, namely reducing data, displaying data, clarifying, and drawing conclusions. **Findings:** the local government which has low internet area has not done enough planning to support the continuity of online learning for the community, the implementation of online learning activities in low internet areas requires different preparation, less maximum implementation, and various difficulties or obstacles that can not be avoided such as the cost of online learning a lot, WiFi signal is not strong, electricity is often extinguished. As a result of this condition, students and college students living in low-internet areas have to struggle to find specific locations that are reached by signal, affordable locations must be reached for 15 min by motorcycle.

**Keywords** Low internet • Learning problem • Planning • Covid-19

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413

## 1 Introduction

The use of information technology media is increasingly in demand in various aspects of life today, especially in the field of education [9, 15]. The use of information technology media in the world of education has become important for humans in recent decades, due to the increasingly rapid and varied technological developments. To develop education in Indonesia, information technology is also increasingly being studied, this reality is evidenced by the high public interest in choosing information technology majors. [12, 17]. Because living in this digital era, all human beings are required to be able to adapt quickly and intelligently to existing technological developments, especially to carry out education.

The need for information technology in education was increasingly felt when it happened The Covid-19 pandemic, which requires education personnel to transition to a rapid learning implementation model with distance learning [2, 8], or carry out learning from home, so that the use of information technology has become a necessity for interaction for every teacher and learner in order to carry out the learning process every day [11]. During this learning, it is also called learning online or online, which allows learners to take lessons from anywhere as long as they have an internet connection. Where learners concentrate their learning activities outside the institution, and accept or submit assignments online through various applications and platforms available in technology media [18]. The learning model that was originally centered in the classroom and the addition of tasks carried out at home or homework, while currently being reversed, learning is centered at home, while in class it is only as an acceptance and collection of assignments and explanations related to assignments given by educators only, that class either online or online. This reverse learning model is now known as flipped classroom or flipping e-learning [3, 18, 19].

Currently, learning through online or online media has become a daily meal for Indonesian students and students, both those living in urban and rural areas, all of whom must enjoy [5], the implementation of online learning aims to cut the spread of the endemic virus [4, 10]. So that the same thing must also be followed and carried out by students who come from rural areas without cellular networks or are in low internet areas. Where the area has not been covered by the cellular network as a whole, in the sense that the network can only be obtained at certain points. So that to provide an internet network you have to go through paid wifi, where the quality of the internet network cannot be said to be good when used due to various obstacles. The limitations of this cellular network and internet network make students and students in these areas experience joys and sorrows that are different from those in urban areas or other areas with good network coverage.

Based on the results of the research that the researchers stated above as well as the reality of the struggles of students and students in searching for internet networks, this research will focus on three main aspects, namely, first, preparation that should be made for learning during areas with difficult internet networks, second, strategy. students and students in low internet areas in participating in during learning, and third, the limitations and difficulties faced by students and students in during learning.

## 2 Method

This research is in the form of field survey research using a qualitative approach, namely research conducted to find out and understand the realities that occur in society regarding learning during the during the Covid-19 pandemic. The technique of collecting this data is through observation and interviews with informants in the field, then the information obtained is temporarily recorded in the researchers' notes.

Sources of data were obtained from 10 students and students representing various levels of education, namely junior high school, senior high school, and public and private universities, where they are implementing online learning in one of the rural areas in Solok Regency, West Sumatra province, Indonesia. Where this area is an area that is far from cities or crowds, so that it only gets permanent electricity, and has not been reached by cellular networks let alone the internet. To analyze the research data, the researcher performed qualitative data analysis procedures, namely reducing data, displaying data, clarifying, and drawing conclusions. To test the validity of the research data, researchers verified and reconfirmed informants.

## 3 Research Results and Discussion

### *Preparation for low internet areas to support the implementation of online learning for students and students during the Covid-19 period*

Learning in various forms requires careful preparation, without serious planning it is certain that the learning that will be carried out will not get maximum results, according to the results of research and expert opinion it can be seen that areas with weak internet networks can do several things to support smooth operation. during the learning process. The preparations intended can be seen in Table 1:

From the table above, it can be seen that there are at least four categories prepared by both the community and the parents of each student, namely first, providing wifi stalls. In accordance with the results of surveys and interviews conducted with students, it is known that to be able to take part in learning during the Covid-19 period they took a ride to a cafe that provided an internet network. The provision of internet networks for learning in various countries has become a habit, because for

**Table 1** Preparation of low internet areas to support learning during the Covid-19 period

No.	Preparation form	Party providing
1	Provide Wifi stalls	Cafe owner
2	Wifi network configuration	Cooperation between shop owners and residents' houses
3	Additional voucher quota	Parents
4	Buy android	Parents

people who have a shop, when the internet network is available, it is also a means of promotion for shop customers [20].

The development of digital technology can be used professionally in the world of education as a means of interaction between students and their educators [13, 16]. The use of this technology in distance learning must involve the internet as a liaison or a means of interacting in learning.

The need for an internet network in several regions in Indonesia is not in line with the facilities available as a network connection device, so cellular or internet networks cannot yet be obtained. Cellular networks can be reached only from certain points, such as hills or houses at high altitudes. So to get an internet network it is necessary to connect a wifi from outside the area which is more than 30 km away.

From the results of the interview, it is known that this wifi is provided by the shop owner who collaborates with wifi users who are in a smooth network area, the wifi user pairs a network capture device at certain points before entering the area without the network. Then install a special tool to catch the wifi network in a place that will be used for wifi stalls. This wifi shop is used by students and university students to carry out daily learning activities during the Covid-19 pandemic.

Furthermore, secondly, from the results of the interview, it is known that there are efforts from the community to configure the internet network between wifi stalls and residents' homes, this effort is carried out because in one village only two wifi stalls are available, these two stalls work together to facilitate learning activities for students and students. configure a wifi network between the two stalls. So that students and students can buy vouchers at one of the existing wifi stalls, and can use them at another shop, or choose the nearest and convenient shop for them. This also helps, because the vouchers are available in selected packages, and the amount at each shop is not the same.

Apart from planning as above, thirdly, increasing the quantity of vouchers or internet quota. In accordance with the results of interviews with informants, it is known that in order to prepare for learning during the Covid-19 period in areas where the internet is weak, parents have to spend quite a lot of money, because in addition to having to prepare package fees, it is also transportation to places that sell internet packages.

The place that sells internet data packages is 30 km away from the residents' residence, and according to the results of observations of package sellers, it is known that internet packages were not sold well in the area at first, but since online learning was implemented, internet packages have been selling well. So that the quantity must be increased. The choice of packages on the voucher is also added, packages are available per week and hourly. 2 h package for Rp. 5000, -, 5 h package for Rp. 10,000, -, and packages a week at a price of Rp. 40,000, -.

In this aspect, the research findings show that learning carried out online requires quite expensive financing, parents of a number of students and students prior to Corona virus can be said to not need to purchase internet packages but with Covid-19 they have to add expenses that were previously considered secondary needs. be primary.



Another finding from the planning carried out by students and students in taking part in learning during the Covid-19 period is that their parents have to buy an android, even though their area is not covered by the internet network and even cellular networks, but the need for android is increasingly felt, this is because students and students every time Today you have to bring your android to a certain location that is accessible to the network in order to get learning material sent by teachers and lecturers to the WhatsApp group.

### ***3.1 Implementation of Online Learning by Students and Students in Low Internet Areas***

The implementation of online learning is basically a flipped classroom learning model, where the center of learning activities is in each house, while the class is an addition to learning activities in the form of acceptance and collection of learning assignments. However, this learning model cannot be carried out completely the same by students and students who are in areas without cellular networks and low internet areas.

The center of learning activities for them is not at home, but in a special place that has an internet connection as a means of online learning. This place is called a wifi shop. Of course, not all students and students can reach this wifi shop quickly, especially those who live in villages without the support of transportation. The only way for them to get to the wifi shop where to learn online is by walking, so it takes a relatively long time.

The distance is not close to making students and students have to prepare breakfast and lunch from home before going to study online, this is the same as going to school when they were at the Elementary School level several years ago. Apart from breakfast and lunch, they also prepare chargers and fees to buy internet vouchers as the main media for online learning.

The implementation of online learning is generally the same as that followed by other students, namely through applications and platforms available in information technology, such as WhatsApp Group (WAG), Google Classroom, Video Call, and Zoom. Only a few people have institutions where they learn to implement offline learning by submitting assignments directly to school once a week, and even then they have to understand the material using Google's help too, because there are so many teaching materials that they cannot understand themselves.

According to them, the learning outcomes that have been carried out cannot be said to be satisfactory, because their understanding of the material is very minimal due to the lack of smooth implementation of learning due to inadequate network quality, as well as difficulty understanding the material without direct teacher guidance. They also feel their eye health has decreased than usual, because they have to deal with an Android screen every day for quite a long time.

The findings above show that learning during the covid-19 period is not the same as the demands of the slogan against Covid, namely learning from home (LFH), [7, 14], because in areas with low internet and difficult cellular networks, learning during requires them to leave the house to find a location that is affordable to the internet network. Along with the drastic development of technology in this modern century, the world of education must be able to compete in its use in various aspects of learning [1]. Learning that is done with technology can be through the help of cellular or with the smart technology known as smartphones today. In this case, user environmental problems should also be a concern.

***Problems and Solutions for Continuity of Learning During Low Internet Areas***

Some areas that are still weak cellular and internet networks are faced with various problems related to learning during the Covid-19 period, according to the survey results it is known that the problems faced by students and students in participating in learning during the Covid-19 period in weak areas of the internet are cellular networks which difficult, expensive, frequent power cuts and poor network quality.

Cellular network is a means of connecting to communicate via mobile phones. Along with its development, cellular networks have been utilized for internet connections, so that this makes it easier for mobile phone users to access the internet smoothly, which is now known as smartphones or androids. Simply by activating the cellular data package, the internet network can be connected to the cellphone.

However, it is different for some residents of this country, where they have not been able to enjoy the main cellular network. Not only was the internet unconnected, they couldn't enjoy the network to make calls and text messages. In some areas, cellular networks can be found at certain points, for example on hills, in fields, or in people's homes at high altitudes. So that communication via electronic media is minimal in the area.

Since the pandemic hit, students and students who come from areas without this network have felt tremendous difficulties. Their communication with friends and teachers or lecturers is not smooth, because usually they communicate via WA or social media using the cellular network for internet packages on Android. In carrying out their learning, they cannot be as good as those on the network smoothly. For online learning that must be followed every day, they can only take advantage of internet vouchers sold at wifi stalls.

The existence of a wifi shop is quite helpful in the implementation of online learning for students and students, but the distance between their house and the wifi shop is also not close. There is also no means of public transportation in that area, and not all of these people have private vehicles. Private vehicles can only be owned by those whose economies have improved, so that many students have to walk to be able to get an internet network in a wifi shop. Everyday fatigue in studying online is inevitable.

Online learning to do from a wifi shop costs a lot of money. The wifi internet package voucher is only available in 3 choices. Students and students must pay Rp. 5,000 to enjoy the wifi network for 2 h, Rp. 10,000 for 5 h, and Rp. 40,000 for a week. This price is not a cheap price when compared to internet packages and vouchers in areas with good networks. If calculated the costs that must be spent per

month, students and students have to pay a fee ranging from Rp. 160,000-200,000, per month for studying only, not including pocket money that must be prepared more every day, because the average duration of study time is 8 h, meaning for those who do not prepare food from home,

In the economic downturn caused by the pandemic, urban communities are experiencing difficulties in fulfilling their daily needs [6]. This is especially true for rural communities, which in fact are at an economic level which is still concerning, only a small proportion of them are in the middle-level economy. In general, the income of rural communities is from agricultural or plantation products. During the pandemic, the selling price of foodstuffs is getting cheaper, while the needs of the community continue to increase, because they have to equip and prepare various forms of medical equipment to prevent the spread of the plague. So, with the increase in the cost of education for their children, it will make the community's economy more difficult and this cannot be denied.

Based on the research of Holzweiss and his friends, the large cost of online learning in a crisis situation can make the economic decline of rural communities which will cause many children to drop out of school [5]. This is also a concern for students who are in areas that are still weak with internet networks.

Another problem faced by people in low internet areas in online learning is that electricity often goes out. Wifi that is connected to reach rural areas is wifi that depends on electric power. So that electricity is also the main source in carrying out online learning for students and students in low internet areas. If the electricity suddenly goes out, learning online can no longer be continued, so students and students have to wait for the electricity to return to be able to continue their studies. During this pandemic, the electricity in the area often goes out, so learning online that requires a full internet connection in learning makes learning disrupted and not optimal.

Another complaint from students and students who live in areas that are difficult to network is a weak internet network or poor network quality. The large number of students and students who use wifi networks to study online at the same time, makes the network run slow. So that they cannot smoothly participate in learning, even though they have tried their best. Sometimes even within a day or two the wifi network doesn't work, this makes them unable to learn at all as long as the wifi is completely dead. There is no other choice for them to carry out online learning other than in a wifi shop, making their learning not work as expected, and not being able to achieve its learning goals optimally.

## **4 Conclusion**

From the presentation of the discussion above, it can be concluded that the implementation of online learning for students and students who come from low internet areas can not be said to be carried out smoothly and optimally. Preparations for learning that can be done have not been able to provide a comprehensive solution

for learning activities, so the implementation of online learning is often constrained. The obstacles or difficulties faced are the absence of a cellular network, the existing wifi internet network is also not smooth, the quality of the wifi network is not good, the price of vouchers is expensive, the electricity often goes out, the wifi stalls are a bit far and must be reached without a vehicle, if a laptop or The smartphone used in online learning is damaged, so the place for electronic service is also far away. Other than that, students and university students also feel tired in studying online that must be done every day. As a result of interacting with electronics that are connected to the internet network every day making them feel tired and dizzy, their learning concentration is also felt to decrease than usual, many subject matter is poorly understood. This makes the struggles of students who come from low internet areas requiring greater sacrifice and the experience of online learning during the Covid-19 pandemic is different from those from cities or areas that are well networked. learning concentration is also felt to be lower than usual, many subject matter is poorly understood. This makes the struggles of students who come from low internet areas requiring greater sacrifice and the experience of online learning during the Covid-19 pandemic is different from those from cities or areas that are well networked. learning concentration is also felt to be lower than usual, many subject matter is poorly understood. This makes the struggles of students who come from low internet areas requiring greater sacrifice and the experience of online learning during the Covid-19 pandemic is different from those from cities or areas that are well networked.

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PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

PAGE 10

PAGE 11

PAGE 12

PAGE 13

PAGE 14

PAGE 15

PAGE 16

PAGE 17

PAGE 18

PAGE 19

PAGE 20