Decision Sciences for COVID-19 Learning Through Case Studies

by 3. Mahyudin Ritonga

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Said Ali Hassan
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Decision Sciences for COVID-19

Learning Through Case Studies

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Preface

Managers, researchers, and interested readers in all disciplines especially those related to the transportation of people, materials, and products from one place to another face an endless list of complex issues every day. They must make the appropriate and most beneficial decisions about each activity they make. One of the essential managerial skills is the ability to allocate and utilize limited resources appropriately for achieving the optimal performance efficiently and, ultimately, to use the most appropriate scientific tools in various disciplines to achieve the desired objectives. That is why "decision sciences" appear at the top of the list that everyone interested in this field needs.

"Decision sciences" is a collaborative approach involving mathematical formulae, business tactics, technological applications, and behavioral sciences to help senior management and practitioners make scientific-driven decisions. Such approaches along with up-to-date technology will help businesses execute various processes in a smoother and better way. These approaches also help in day-to-day operations and projections; they will make it easier for business leaders to make smarter and more efficient decisions that will improve their work performance and the functioning of the overall marketplace. Ultimately, the decision sciences are about enhancing individual, group, organizational, societal, and national decision making in support of a better future.

This book aims to provide relevant theoretical and practical frameworks and the latest research findings in the domain of decision sciences and applications for disaster risk reduction of COVID-19. It is written for researchers, executives, and practitioners who want to enrich their scientific and practical knowledge and improve their understanding of the decision-making process in facing real-world problems in reducing the emerging disaster risk of COVID-19.

The used modern and up-to-date decision sciences techniques will make it easier for business leaders and managers in the government and in the health sector to make smarter and more efficient decisions that will improve the firms' functioning and performance.

The target audience of this book are composed of researchers, professionals, leaders, managers, and executives working in the field of decision sciences and applications in most of the application areas especially in the field of COVID-19 and similar pandemics. The book is appropriate and helpful for individual, group, organizational, and societal decision makers seeking for making better decisions and achieving optimum solutions to real-life problems. The diversity of the contained chapters related to multidisciplinary decision sciences and applications topics will benefit researchers and practitioners facing real-world problems who seek to optimize their decision-making process and enhance the performance of their works for a better future.

Giza, Egypt — Said Ali Hassan
Giza, Egypt — Ali Wagdy Mohamed
Riyadh, Saudi Arabia — Khalid Abdulaziz Alnowibet

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Acknowledgment

The editors would like to acknowledge the help of each one of the respected authors involved in this book who contributed their time and expertise to this valuable work.

The editors would also like to acknowledge the valuable contributions of all the reviewers regarding the improvement of quality, intelligibility, and content presentation of the enclosed chapters.

Without the support of all mentioned persons, this book would not have become a reality; we highly appreciate their contribution.

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Introduction

In December 2019, Wuhan, China was the origin of a pneumonia of unknown cause. Cases of COVID-19 were not limited to this city, and by January, confirmed cases were detected outside Wuhan. Currently, the entire world is suffering from a global epidemic of COVID-19 that has infected thousands of people in almost all countries.

Currently, the entire world is suffering from a global epidemic of COVID-19 that has infected millions of people in almost all countries. The new coronavirus (COVID-19) put humans in all countries in front of a huge danger. The major signs of COVID-19 are declared so that any individual can discover whether or not he has such symptoms.

Updated statistics indicate clearly that the current and the near future situations are not quite right in such a way that foreshadows a catastrophe for many countries of the world, if the situation continues as it is now and if strict measures are not taken at the level of governments and people.

The pandemic of coronavirus has become the talk of the whole world, and it will remain so in the coming period because of the imminent danger it poses to humanity in all countries of the world.

It is very important that this worldwide focus draw the attention of scientists and researchers in the field of optimization to the effective contribution in the optimal utilization of available resources and optimal decision making to help in reducing the emerging disaster risk of COVID-19.

In this book, authors of chapters utilize the applications of decision science techniques and tools in combating against the epidemic of COVID-19 to stand up and face the various challenges facing the whole world.

The new applications of decision science techniques can be regarded as a continuously emerging field in all areas of interest including this very important area of coronavirus pandemic which has become the focus of attention of the whole world. Managers in all disciplines face an endless list of complex issues every day. They must make decisions about each activity they make. One of the essential managerial skills is the ability to allocate and utilize limited resources appropriately in the efforts of achieving the optimal performance efficiently.

Decision sciences use a number of mathematical techniques to solve problems in all fields of study. It is helpful to aid in making decisions to achieve desired objectives and help managers do their jobs more effectively. These techniques help managers allocate resources more effectively and enable them to better optimize the performance of their works. They allow people to analyze a greater number of alternatives and constraints which results in greater confidence in the optimal choice.

The advancements in decision sciences theory and applications can be regarded as a continuously emerging field in all areas of interest including technology, industry, energy, healthcare, education, agriculture, social sciences, and others. Managers in all disciplines face an endless list of complex issues every day; they must make decisions about each activity they make. One of the essential managerial skills is the ability to allocate and utilize limited resources appropriately in the efforts of achieving the optimal performance efficiently.

Quantitative approaches use a number of mathematical techniques to solve problems in all fields of study. It is helpful to aid in making decisions to achieve desired objectives and help managers do their jobs more effectively. These techniques help managers allocate resources more effectively and enable them to better optimize the performance of their works. The mathematical models allow people to analyze a greater number of alternatives and constraints which results in greater confidence in the optimal choice.

Quantitative techniques are the most widely applied methods; they play an important role in the operation of problem solving and this importance is likely to increase, creating the opportunity to play an even greater role. With the recent dramatic improvements in the real-time availability of computer speed and evolving of new exact and approximate solution techniques, this role will increase.

It is very necessary that this draws the attention of scientists and researchers in the fields of decision sciences and supporting decision making to the effective contribution in the optimal utilization of available resources and optimal decision making to help in contributing to the theory and in facing the real-world problems.

List of topics of decision sciences includes mathematical modeling; linear, nonlinear, integer, binary programming models; multi-criteria decision making; network optimization models; project management; game theory models; queueing theory models; inventory theory models; stochastic models; decision making under uncertainty and risk; decision support systems; modeling and simulation; statistical models; forecasting techniques; metaheuristic techniques; heuristic techniques; artificial intelligence and machine learning; data analytics; operations management; crisis management; risk management; supply chain management; business decision-making problems; leadership decision making; strategic planning; innovation and creativity; and behavioral decisions.

To this end, we included high-quality original submissions to this book that reflect the unprecedented momentum garnered by this research area.

Organization of the Book

The book is organized into seven parts with 25 chapters. Parts are as follows:

Part I: Artificial Intelligence
Part II: Forecasting Techniques
Part III: Social Sciences
Part IV: Optimization Techniques
Part V: Data Science
Part VI: COVID-19 Detection
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He has field experience in working as Scientific Manager, International Center for Systems (ICS), Zamalek, Cairo, Egypt (1986–1996); Member of the Board of Directors of the Higher Institute of Computer Science and Information Systems, 6th of October City,

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He serves as an editor and as a reviewer for many international accredited journals; he published more than 110 research papers in national and international journals and conferences, supervised more than 60 M. Sc. and Ph.D. theses in Egypt and Saudi Arabia, and participated as a PI and Co-PI in more than 30 funded projects.

His research interests lie broadly in operations research, optimization, decision sciences, forecasting, management science, strategic management, and modeling and solving of real-life applications.

Ali Wagdy Mohamed received his B.Sc., M.Sc., and Ph.D. degrees from Cairo University, in 2000, 2004, and 2010, respectively. Ali Wagdy is an Associate Professor at Operations Research Department, Faculty of Graduate Studies for Statistical Research, Cairo University, Egypt. Currently, he is an Associate Professor of Statistics at Wireless Intelligent Networks Center (WINC), Faculty of Engineering and Applied Sciences, Nile University. Recently, he has been recognized among the top 2% scientists according to Stanford University report 2019. He serves as a reviewer of more than 70 international accredited top-tier journals and has been awarded the Publons Peer Review Awards 2018, for placing in the top 1% of reviewers worldwide in assorted fields. He is an associate editor with *Swarm and Evolutionary Computation Journal*, Elsevier. He is editor of more than 10 journals of information sciences, applied mathematics, Engineering, system science, and operations research. He has presented and participated in more than 5 international conferences. He participated as a member of the reviewer committee for 35 different conferences sponsored by Springer and IEEE. He has obtained Rank 3 in CEC'17 competitions on single

objective bound constrained real-parameter numerical optimization in Proc of IEEE Congress on Evolutionary Computation, IEEE-CEC 2017, San Sebastián, Spain. Besides, he obtained Rank 3 and Rank 2 in CEC'18 competitions on single objective bound constrained real-parameter numerical optimization and competition on large scale global optimization, in Proc of IEEE Congress on Evolutionary Computation, IEEE-CEC 2017, Sao Paolo, Brazil. He has obtained Rank 2 in CEC'20 competitions on single objective bound constrained real-parameter numerical optimization in Proc of IEEE Congress on Evolutionary Computation, IEEE-CEC 2020, UK. He has published more than 70 papers in reputed and high impact journals like *Information Sciences*, *Swarm and Evolutionary Computation*, *Computers & Industrial Engineering*, *Intelligent Manufacturing*, *Soft Computing*, and *International Journal of Machine Learning and Cybernetics*. He is interested in mathematical and statistical modeling, stochastic and deterministic optimization, swarm intelligence, and evolutionary computation. Additionally, he is also interested in real-world problems such as industrial, transportation, manufacturing, education, and capital investment problems. 2 Ph.D. and 1 master's degrees have been completed under his supervision.

Khalid Abdulaziz Alnowibet was born on 1971, Riyadh, Saudi Arabia. Mr. Alnowibet got his B.Sc. degree in Operations Research in 1992 from the College of Sciences, King Saud University, Riyadh, Kingdom of Saudi Arabia. In 1994, Mr. Alnowibet moved to the USA to get his M.Sc. degree in Operations Research from the School of Engineering and Applied Sciences, George Washington University, Washington DC, USA. In 2004, Mr. Alnowibet got his Ph.D. degree in Operations Research, School of Engineering, North Carolina State University, North Carolina State, USA. His dissertation title was "Nonstationary Loss Queues and Network of Nonstationary Loss Queues." Mr. Alnowibet published several papers in several research areas related to operations research such as Performance Evaluation Using Stochastic Modeling, Queueing Networks Applications, Queueing Theory and Applications, Stochastic Processes Theory and

Applications, and Modeling Communication Networks. Mr. Alnowibet now is an associate professor at King Saud University, Department of Operations Research, for more than 15 years. During his service in the university, Mr. Alnowibet was appointed to several key administrative positions in the university. He also supervised graduate students and participated in defending many theses.

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Chapter 13
Participation and Active Contribution of Private Universities in the Prevention of the Covid-19 Pandemic Transmission

Mahyudin Ritonga, Ahmad Lahmi, Sandra Ayu, Yufi Latmini Lasari, Sri Wahyuni, Desminar, Armalena, and Fitria Sartika

Abstract The study aims to reveal how active participation forms and real contributions of higher education institutions in preventing the transmission of the Covid-19 pandemic. To find data related to the research focus, this study used qualitative methods, the data sources were university leaders, students, and several community members who were selected by random sampling, data collection was carried out by interview, observation, and documentation study. The results of the study can be concluded that Muhammadiyah universities in Indonesia contribute significantly in handling the transmission of Covid-19 through the production and distribution of Hand Sanitizer, production and distribution of medical face shields, distribution of groceries, online transfer of lectures, the provision of distance learning scholarships, work from home instruction, and socialization through operational cars. This research is limited in the scope of participatory in helping campus communities and communities living around the campus. The practical implication of this research is that every institution and community can take action to reduce the impact of Covid-19 in accordance with their respective abilities and positions. University leaders everywhere can mobilize all potentials in their institutions to handle and reduce the impact of Covid-19, because such policies have a real contribution to the existing community. People get the attention of every institution around them.

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Keywords Contribution · Prevention · Covid-19

13.1 Introduction

The corona virus that has swept the world has caused various new problems for human life. In the health aspect, Covid-19 has caused many victims to die in the world (Zhang et al. 2020), in the economic field the corona virus has made it difficult for many people to make ends meet (Ozili and Arun 2020; Roy 2020; Susilawati et al. 2020), while in the educational aspect, each level of education transfers the online learning process (Ritonga et al. 2020a, b; Abidah et al. 2020; Suparman et al. 2020). Likewise, in the field of work, many companies have terminated employment relations with employees due to difficulties in paying their salaries (Inayah and Surisman 2020; Rahma and Arvianti 2020).

The extent of the impact of Covid-19 on human life requires the involvement of all parties to be actively involved in finding solutions according to their respective abilities and positions, because if you only hope for the government, handling the impact of Covid-19 will be slower. Muhammadiyah as one of the largest community organizations in Indonesia has long shown its active participation in finding solutions to all problems that arise in the Indonesia country (Rusydi 2016; Syahputra 2014). This participation can be seen from the involvement of various business charities in seeking solutions to every problem faced by the nation whether problems in the fields of religion, social, economy, health, and so on (Suyadi et al. 2020).

One of the Muhammadiyah organization's charities is Muhammadiyah and Aisyiyah colleges. The existence of Muhammadiyah universities in various provinces and cities in Indonesia also has a function to provide enlightenment in finding solutions faced by the nation as befits other charities owned by Muhammadiyah. Therefore, this research is intended to reveal the form of participation and real contribution of Muhammadiyah higher education in preventing the transmission of Covid-19.

Therefore, Muhammadiyah and Muhammadiyah Higher Education played an important role in overcoming the impact of this Covid-19. Muhammadiyah University of West Sumatra as one of the Muhammadiyah Universities has taken concrete steps in order to deal with the pandemic problem. In this scientific article, the author will describe several policies and concrete actions that have been taken by this university as a form of concern and efforts to deal with the impact of Covid-19, both on campus and on the wider community. With the aim of achieving the goals of the Tri Dharma of higher university, and the existence of Muhammadiyah Higher Education can be felt by the community, especially in difficult times such as the conditions during the Covid-19 pandemic.

13.2 Methodology

13.2.1 Research Approach

The research was carried out using a multidisciplinary scientific and interdisciplinary approach, this is based on a typical research that requires an approach in various scientific fields, namely the Covid-19 problem that affects various sectors of life must also be disclosed according to related fields. While methodologically the approach used in this research is qualitative, because what will be revealed is related to the meaning contained in actions and facts in the research location.

13.2.2 Research Setting

This research was conducted in four cities in the West Sumatra Region, Indonesia, to be precise Padang City, Padang Panjang City, Bukittinggi City, and Payakumbuh City, these four cities were used as research sites because the West Sumatra Muhammadiyah University Campus is located in these four cities, while the time needed for the completion of this research lasted for 6 months, from April to September 2020.

13.2.3 Research Participant

Participants who were involved in this research were university leaders and students, the leaders in question were starting from the level of the head of the institution with 3 people, 12 heads of administration for each faculty, and 3 people from the PR department. Other participants who were included in this study were students who were selected purposively, according to the research that had been carried out by purposive selection of informants, the number of students who became informants was 48 people, and this number was based on the taking of each faculty as many as four people.

13.2.4 Data Collection

Research data obtained from informants described above, is related to the active participation of Muhammadiyah universities in preventing the transmission of Covid-19, for that data collection techniques used in this study are interviews, documentation, and observation studies, the form of interview used is structured, this is because get information focused on the steps taken by the leadership in

preventing Covid-19. The documentation in question is to collect data from documents available at the Muhammadiyah University of West Sumatra related to the prevention of Covid-19. Observation is used in this study to collect data that occurs in the field by being actively involved.

13.2.5 Data Analysis

All data collected were then analyzed through four stages, namely data display, data reduction, interpretation, and conclusion. To ensure the validity of the data, this study used triangulation of sources, techniques, time. Source triangulation is meant here is that data obtained from certain sources is verified with other sources, as well as data obtained through certain techniques, verification is carried out using other techniques, and time triangulation means that the data obtained at a certain time is verified at a certain time different.

13.3 Results and Discussion

In accordance with the results obtained, it is known that as a form of concern for Muhammadiyah Higher Education in overcoming the impact of the Covid-19 pandemic, there are seven policies and concrete actions that have been taken by Muhammadiyah University of West Sumatra for the internal campus community and the wider community in West Sumatra, participation and contribution can be seen in the following table:

The data contained in Table 13.1 can be explained that the Muhammadiyah University of West Sumatra shows its participation in anticipating the transmission of Covid-19 by producing hand sanitizers, this is in accordance with the results of the documentation that the researchers did as in Fig. 13.1;

The success in producing this hand sanitizer cannot be separated from the encouragement of both the morale and material of the university leadership to the pharmacy faculty to contribute in anticipating the transmission of Covid-19. The

Table 13.1 Muhammadiyah University contribution in overcoming Covid-19 transmission

No.	Form participant	Parties who get
1	Hand sanitizer production	Campus internal and external
2	Produce and share medical faces	Internal and external
3	Groceries	External
4	During	Internal
5	During college scholarships	Internal
6	Work from home	Internal
7	Socialization	Internal and external

Fig. 13.1 Production results of hand sanitizer, Faculty of Pharmacy, UM Sumatra Barat

hand sanitizers that have been produced are then distributed to internal and external parties for free, especially places that are public facilities such as mosques, according to the results of interviews conducted by researchers with mosque administrators, they expressed their gratitude for the distribution of this hand sanitizer, because in Covid-19 conditions besides significantly increased prices are also difficult to obtain.

As reported by merdeka.com, hand sanitizer is an antiseptic hand sanitizer that comes from a mixture of chemicals and can be used to sterilize the human body which is infested by microorganisms such as germs, bacteria, and bad viruses that reproduce in the cells of living things, including Corona virus that is currently endemic. The importance of washing hands regularly during this pandemic has made some people hunt for hand sanitizers even though the price has soared. As recommended by the World Health Organization (WHO) to produce their own hand sanitizers, lecturers and students of the UM Sumatra Barat Faculty of Science and Technology, Pharmacy Studies study program collaborated in producing hand sanitizers to be distributed to the community around the campus and public facilities.

The UM Sumatra Barat Public Relations writer interviewed by cellular telephone on Friday, May 8, 2020, explained that the hand sanitizers produced by lecturers and students of Pharmacy Studies have been distributed to the community around the campus, students living around the campus, and distributed to facilities public such as hospitals and other public facilities in the region or region through the Muhammadiyah Covid-19 Command Center (MCCC). This contribution can be said to be a form and effort to deal with the spread of Covid-19, because it is in accordance with several research results that washing hands is part of real action to anticipate the transmission of Covid-19 (Jing et al. 2020; Berardi et al. 2020). Apart from that, Islam also reminds us of the importance of maintaining cleanliness (Amin et al. 2020) one of which can be done by washing hands.

UM Sumatra Barat also produces mass production of medical face shields, as reported by haluanriau.co, the leadership of the University revealed that UM Sumatra Barat has taken various forms of concern as an effort to prevent Covid-19 transmission, both for internal and external campus. After the production of hand sanitizers by lecturers and students of Pharmacy Studies, it was continued with the production of Medical Face Shield by the Faculty of Engineering. This was done as a form of UM Sumatra Barat concern for medical personnel who are fighting at the forefront of fighting the spread of Covid-19.

Medical Face Shield this has been distributed by the UM Sumatra Barat Covid-19 Care Team to several cities in West Sumatra, especially hospitals that handle Covid-19 patients directly. This contribution is expressed by the researchers that MFS is

needed in the Covid-19 conditions (Rizki and Kurniawan 2020; Matuschek et al. 2020). Because by using MFS, transmission of virus-19 through its attachment to the face will be minimized (Chua et al. 2020; Dwirusman 2020; Worby and Chang 2020). The contribution of UM Sumatra Barat in the procurement of MFS can be felt internally and externally by the campus without having to spend money.

In addition, the Muhammadiyah University of West Sumatra also participates in distributing basic necessities. Facing this pandemic period, the community seems like a dilemma, on the one hand, they have to work to make a living to meet their daily needs, while, on the other hand, they have to obey the rules to stay at home (Chee 2020; Chen et al. 2020). Moreover, people generally work outside the home, such as traders, laborers, drivers, and the like. The need for foodstuffs is very urgent to be in stock during this pandemic, while finance is no longer adequate, including students who have to survive overseas for the smooth running of online lectures. Therefore, UM Sumatra Barat took action to distribute groceries to the community and also compensation to students affected by Covid-19.

As explained by the Public Relations Division of UM Sumatra Barat a few days ago, these basic necessities and compensation have been distributed to students who live around the campus or stay in their boarding houses. Staple foods were also distributed to local communities affected by this pandemic. UM Sumatra Barat in collaboration with MCCC also distributes basic necessities to the people of the West Sumatra region, and the distribution is submitted to MCCC.

To anticipate the transmission of Covid-19, UM Sumatra Barat also takes a policy so that lectures are carried out during the course. In accordance with the Ministry of Education and Culture Circular No. 4 of 2020 concerning the Implementation of Education Policies in the Covid-19 Emergency Period, that since March 16, 2020 all forms of learning activities in all educational institutions in Indonesia are closed or transferred to homes, including universities. UM Sumatra Barat issued UM Sumatra Barat Chancellor's Circular No.0253/II.3.AU/F/2020 concerning the Policy of the UM Sumatra Barat regarding the Prevention of COVID-19, that all forms of lecture activities are transferred to online or online lectures until the next circulation is issued. This Circular Letter was followed by Circular of the Chancellor of UM Sumatra Barat No.0323/II.3.AU/F/2020, that online lecture activities will be effective until 02 June 2020. This was done in response to the West Sumatra government's protocol, in an effort to avoid direct contact and associations that caused crowds. So that social distancing, physical distancing, and stay at home must be applied, and it has even been upgraded to Large-Scale Social Restrictions (PSBB) in the administrative area of West Sumatra.

This learning distance is conducted through various platforms or the best application features that support the implementation of distance learning (Suparman et al. 2020). Interestingly, UM Sumatra Barat also collaborates with Telkomsel to provide free Internet quota for students, as an effort to reduce student expenses in getting Internet quota to carry out lectures online.

Since the online lecture period has to be extended because Large-Scale Social Restrictions (PSBB) have been enforced in the West Sumatra region, UM Sumatra Barat provides Distance Learning scholarships to assist students in implementing

online lectures. This scholarship is given in order to help students buy Internet package quotas during online lectures. This is intended so that students are not overwhelmed by the use of quite a lot of Internet quota during this online college period.

This learning distance scholarship is prioritized for students who come from economically vulnerable or underprivileged families, the requirements for getting the scholarship are accompanied by a Certificate of Disability (SKTM) from the sub-district where the student is domiciled, then all data is inputted online via the link provided by UM Sumatra Barat.

Based on UM Sumatra Barat Chancellor's Circular No.0323/II.3.AU/F/2020 regarding the Policy of the University of Muhammadiyah Sumatra West regarding the Prevention of COVID-19, that all activities of the UM Sumatra Barat academic community at all levels and faculties must be carried out online from their respective homes or WFH, both students, lecturers, employees and other employees. The entire UM Sumatra Barat academic community is also prohibited from traveling abroad in any way, and it is recommended not to travel outside the region. In this Circular, it is also explained that all forms of campus administration services are carried out online, and within a certain time administrative staff shifts are applied. The instructions in this Circular Letter are valid until 02 June 2020.

The UM Sumatra Barat Public Relations Division said that this socialization was carried out by the UM Sumatra Barat in collaboration with Muhammadiyah Peduli using ambulance. Officers who have been appointed to travel around the city of Padang use the car to urge the public to adhere to the rules for staying at home, washing their hands regularly, maintaining a clean and healthy lifestyle, avoiding gatherings or crowds, checking themselves into health facilities when experiencing illness or have a fever, spray disinfectant around each house, and when leaving the house it is expected to comply with the physical distancing appeal, namely maintaining a safe distance from other people in order to protect oneself, family, and others from spreading the corona virus. Through this, a contact number that the public can contact to update information related to Covid-19 is also informed. This socialization is considered very beneficial for the general public, because not all people get the same information from each village they live in.

From Table 13.1, it can also be known that UM Sumatra Barat also provides groceries for people outside the campus. In accordance with the information obtained from the head of public relations he said that the community at the time of Covid-19 is experiencing economic difficulties, so that all parties without exception educational institutions must have attention to them (PR, Interviews 2020). Another informant mentioned that during Covid-19 they have received three times the assistance in the form of food from UM Sumatra Barat (Informant, Interview 2020).

The Covid-19 pandemic has had a wide impact on various aspects of people's lives, especially on the economic aspect. Varona and Gonzales warned of uncertainty when the end of Covid-19 has impacted the economic recession and reduced levels of economic activity (Varona and Gonzales 2021). Reduced economic activity automatically results in a decrease in the level of the community economy.

Table 13.2 Form of scholarship during Covid-19

No	Jenis Beasiswa	Periode
1	Pemotongan SPP	Semester
2	Free semester exam money	Semester
3	Free registration	Registration
4	Internet quota	Covid-19 period

UM West Sumatra also provides scholarships to its students during Covid-19. In accordance with the information obtained, both through documentation studies and interviews, the types of scholarships provided are as in Table 13.2:

From the results of interviews with several informants it is known that UM Sumatra Barat provides tuition waivers to them, as expressed by students of the Faculty of Economics who stated that in normal times they must pay the full 2.500.000,-IDR/semester, but during Covid-19 they are only obliged to pay 1,750,000,-IDR/Semester (Informant, Interview 2020). When confirmed with the vice rector of finance he stated that UM Sumatra Barat realizes that the rights of students during the Covid-19 period are not entirely obtained, therefore the policy that can be made is to reduce the SPP that they must pay (Informant, Interview 2020).

From the existing documents it is also known that UM Sumatra Barat provides tuition waiver for all students of 750,000,-IDR/Semester during Covid-19 (Documentation Study 2020). The results of interviews and documentation studies prove that UM Sumatra Barat makes a real and beneficial contribution to students.

In addition, other scholarships are also given in the form of free exam money, as a private campus that does not get financing from the State. UM Sumatra Barat in normal times requires students to pay the final exam fee of 10,000,-IDR/SKS, but during the Covid-19 period the fee is not required to students. According to the information obtained, this policy was established because UM Sumatra Barat is aware of the economic difficulties experienced by parents of students.

UM Sumatra Barat also provides fee waivers for all prospective students, namely free registration money. In normal conditions, UM Sumatra Barat does not provide access to prospective students before they pay to get a PIN, but in the Covid-19 situation everyone who wants to enroll in UM Sumatra Barat can register on https://pmb.umsb.ac.id/form without having to pay off for free. This data shows the high concern of UM Sumatra Barat to the economic condition of the community due to the impact of Covid-19.

Another participatory in Covid-19 response conducted by UM Sumatra Barat is in the form of instruction to learn and work from home. In accordance with the rector's instructions, it is stated that the learning process is carried out on a during basis. Students and lecturers required to utilize various platforms for learning sustainability, such as google meetings, zoom meetings, http://siak.umsb.ac.id/ and others. This policy is all to avoid the spread of the Covid-19 virus.

In line with the implementation of learning and working from home, UM Sumatra Barat also provides Internet quota to all students, lecturers, and employees. Because without the provision of Internet quota, it is impossible for the policy to run as

expected. Therefore, according to the data obtained Internet quota is valid for all human resources at UM Sumatra Barat who are registered handphone number on the UM Sumatra Barat database.

The implementation of the policy of studying and working from home during Covid-19 is also widely carried out by other institutions and universities. In his research Vyas and Butakhio explained that working from home provides new experiences to employees and employers to be able to get the job done well (Vyas and Butakhieo 2020). Completion of work and learning will not be possible to get good results without being supported by sufficient Internet quota. Mursal and friends reminded not a few parents who have to ask neighbors for help for the continuity of their child's education in the time of Covid-19 (Mursal et al. 2021).

13.4 Conclusion

From the explanation above, it can be concluded that there were several policies taken by the UM Sumatra Barat in the face of this Covid-19 pandemic. There are three policies for campus internals such as WFH instruction, online lectures, and PJJ Scholarships. Then four other actions apply to the internal and external environment of the campus or the wider community, namely the production and distribution of hand sanitizers, production and distribution of medical face shields for medical personnel, distribution of compensation and basic necessities, and socialization through operational cars to urge the public to make efforts, i.e. efforts to prevent the transmission of Covid-19. The caring action and real contributions that have been taken by the UM Sumatera Barat together with Muhammadiyah Cares and the Muhammadiyah Command Center can overcome the impact of the Covid-19 pandemic, so that UM Sumatera Barat and Muhammadiyah West Sumatra deserve to be role models in society in general.

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