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Analysis of Sebelas Maret University Student Awareness against Mask Waste and Dumask Program on Campus

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ABSTRACT. The occurrence of the Covid-19 pandemic throughout the world, including Indonesia, has caused many changes in people's lifestyles. One of them is wearing a mask. With so many people wearing masks and the long time of the pandemic, a pile of mask waste has arisen. Currently, the masks that are often used are disposable masks or medical masks. This medical mask waste is included in B3 waste which must be handled specifically to avoid the negative impacts caused. As a student who has the role of agent of change, he must participate in the management of this medical mask waste. Therefore, this study was conducted to determine the environmental awareness of UNS students, especially against medical mask waste. This research method was carried out using a sampling method (questionnaire) which was then analyzed by data. Respondents came from Sebelas Maret University students with a total of 40 student respondents. Respondents have worn masks outside their homes but have not taken steps to properly dispose of masks. One way to treat campus medical mask waste is Dumask which is available through the application and website. However, there are still many who do not know about this Dumask because there are only 18 points spread across Surakarta and Yogyakarta. There are 4 factors that influence a person to do environmental awareness. After knowing Dumask, respondents' interest in participating was very high. So it is necessary to develop Dumask and students should increase environmental awareness.

Keywords: B3 waste, medical mask waste, environmental awareness.

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1. Introduction

The Covid-19 pandemic, which has become endemic throughout the world, including Indonesia, is currently a problem that must be addressed immediately. The Covid-19 pandemic has brought many changes to the lives of people in the world, especially in Indonesia. With cases increasing every day, the Indonesian government has issued various policies in order to deal with the Covid-19 pandemic. Several policies implemented by the government, such as 3M, are social distancing, wearing masks, and washing hands. The government also limits the space for citizens to move in order to limit the spread of Covid-19 (Mahardhani, 2020). People now have to adapt to the pattern of life during the Covid-19 pandemic. One of them is a new habit regarding the discipline of the Covid-19 health protocol which aims to reduce the transmission of the Covid-19 virus (Farokhah et al., 2021). Since the Covid-19 pandemic, the policy made by the government has become a new habit for the community, especially the habit of using masks when they want to travel or leave the house. Transmission of the Covid-19 virus can occur through splashes when sneezing or coughing between humans (Lambacing and Ferdiansyah, 2020). Therefore, the use of masks is very important to carry out daily activities when leaving the house.

With the new habit of people wearing masks during the pandemic, the amount of mask waste generated has also increased. The spread of this virus also adds to the problem of waste, especially medical waste. The waste produced is in the form of a maker that is used by medical and non-medical personnel or the public (Ameridya, 2021). Not a few people who use disposable masks and throw them away. This of course will result in the accumulation of more mask waste. The waste that continues to be generated, especially mask waste which is often used by the community, causes piles that will pollute and damage the environment. According to Putra (2021), the Indonesian Institute of Sciences (LIPI) also noted that in the range of March to September 2020, the amount stockpiled was of medical waste estimated at 1,662.75 tons. Waste management, especially masks, is an activity that is still a local and global issue. The majority of people still do not know the meaning and types of B3 waste, especially B3 waste from Covid-19 (Maimunawaro, 2021). Currently in Indonesia there is no legal provision that specifically regulates the management of waste masks used by the public during the current Covid-19 pandemic (Oktama, 2021). People still dispose of all types of waste without prior separation (Putra, et al., 2019). Before being disposed of, the mask waste should be disinfected first by soaking it in a disinfectant solution.

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The spread of COVID-19 not only disrupts the economic and health sectors, but also disrupts environmental hygiene due to the increasing amount of waste produced by people in Indonesia. This virus outbreak increases the problem of waste, especially medical waste. Medical waste can be in the form of face shields, PPE (Personal Protective Equipment), and also waste masks used by medical and non-medical personnel or the public. The waste that continues to be generated, especially mask waste which is often used by the community, causes accumulation which has an impact on polluting and damaging the environment (Budiastuti et al., 2021). When people are not aware that they have littered and do not understand how to process mask waste, this will trigger environmental damage with pollution due to mask waste that is not processed properly and safely. The increase in medical waste that occurs, one of the factors is due to the lack of supervision carried out by the government so that there is a lack of public awareness of environmental pollution due to mask waste. A regulation is needed to be formed in order to control people in their behavior so as not to harm other people and their environment (Fentia et al., 2020). The increase in the use of masks is also used by irresponsible people and it is feared that used masks will be recycled and resold to the market. Therefore, education is needed to increase understanding regarding the prevention of COVID-19, the correct use of masks, and the management of waste disposal of used masks.

Because the use of masks is a must, the volume of mask needs is quite high. The increasing use of masks and other types of PPE has led to an increase in the volume of medical waste. Currently the condition of medical waste is not in accordance with the requirements as stated in the regulations. These conditions include the direct disposal of medical waste into the environment, non-standard management, limited medical waste processing services, and limited understanding of medical waste management. Medical waste management is carried out by sorting medical waste in a place that is in accordance with the characteristics of the medical waste itself, such as chemicals, radioactivity, and volume (Prasetiawan, 2020). If medical waste has been collected, it will then go through a processing process before being disposed of in a domestic waste disposal site. B3 waste management must be carried out with the principle of vigilance and environmental friendliness (Purwanti, 2018). Special treatment and facilities are required from the time the waste is generated until it is destroyed. Medical waste masks need to be taken seriously. Seeing that the Covid-19 virus is able to survive under certain conditions, it can take several days for the virus to not actively infect humans. However, starting with a standard disinfection process (using soap), disinfectant, or by heating, the virus will be easy to inactivate or not spread.

Judging from the impact, the management of medical waste, especially masks, requires collaboration and synergy from stakeholders to realize an integrated and safe waste management from an environmental and human perspective. In addition, medical waste management is expected to minimize environmental impacts and take advantage of the existing potential for further utilization (Nurwahyuni et al., 2020). Starting from this concern, Gadjah Mada University collaborated with the Bandung Institute of Technology and Sebelas Maret University to create a program in the form of a medical waste management system for disposable masks and plastic gloves in order to reduce the impact of these wastes on the environment. The management system is named Dumask (Dropbox-Used Mask) which was created with the specific purpose of providing a place for the disposal of used masks and gloves from the general public. The Dumask project started

with the collection of waste masks and gloves using boxes that were already available at certain points, and the creation of an application to monitor the dropbox and its incinerator. If the box is full, then the officer will come to pick up the medical waste box and it will be destroyed with a high-temperature heater or commonly called the pyrolysis method. The purpose of this study was to determine the environmental awareness of UNS students towards mask waste and the intention to participate in Dumask (dropbox-used masks) on campus. With the Dumask program, it is hoped that the project can make a real contribution to the management of medical waste during the Covid-19 pandemic.

2. Materials and Methods

2.1 Method Sampling (questionnaire)

The research method used is quantitative content analysis. The quantitative content analysis method was carried out to determine the relationship between human behavior in disposing of mask waste carelessly and increasing medical waste. A quantitative approach to measuring and analyzing data obtained, through an online survey link. This research was conducted from October to November 2021. The population in our study were Sebelas Maret University students who disposed of waste masks during the COVID-19 pandemic. Sampling using purposive sampling technique to find cases that are relevant to the disposal of mask waste. This technique is a basic sampling technique that has a group of subjects or samples to study and is in accordance with the research objectives, by taking 42 respondents. In getting respondents, we use Google Forms to create an online survey. The survey was distributed through various social media such as LINE, WhatsApp, and Instagram. Quantitative data collection techniques in this study used primary data collection and secondary data through survey research methods. Survey research is a method in which the researcher will ask a number of people the same question and then record their answers as part of the research.

2.2 Data Analysis

To complete the testing of this study used data collection in the form of a questionnaire. The questionnaire was addressed to Sebelas Maret University students as respondents. The data obtained are quantitative data. After the data was collected, it was analyzed descriptively. Descriptive assessment technique is a technique used to create an overview of the data set.

3. Results and Discussion

3.1 Student Awareness

To analyze the awareness of UNS students on mask waste and the Dumask program, a questionnaire was given to become respondents. From the questionnaire, 42 respondents were obtained, of which 40 were UNS students and the other 2 were not. Most of the respondents were 20 years old, as many as 23 respondents. According to the Ministry of Environment and Forestry, medical masks are categorized as B3 waste, which is handled in accordance with the handling of B3 waste. Based on the questionnaire, most of the respondents already understand that masks are B3 waste. Only 2 respondents think that masks do not include B3 waste. During this pandemic, all respondents have used masks when outside the house. However, only a few respondents already understand how to dispose of mask waste. A total of 23 respondents did not understand how to properly

dispose of mask waste. Disposal of waste masks should not be combined with other disposals. Most of the respondents did not throw away the masks by collecting them together. Only 13 respondents threw away the masks by collecting them together. Respondents also did not spray disinfectant on the masks to be disposed of. Only 5 respondents who sprayed disinfectant on masks that would be discarded. To tear the mask, as many as 33 respondents had torn the mask before throwing it away. A total of 27 respondents have also disposed of masks in their proper place. Based on the guidelines of the Ministry of Health, after disposing of garbage, you should wash your hands. However, only 25 respondents washed their hands after disposing of masks. A total of 17 respondents still have not implemented the Ministry of Health guidelines.

During this pandemic, everyone is required to wear a mask to prevent transmission of the virus, causing more and more mask waste. A total of 26 respondents often saw piles of mask waste. This shows the amount of waste masks that exist today. A total of 38 respondents strongly agree that using masks is currently a new habit since the pandemic and 23 respondents also strongly agree that these medical masks are safer and more effective to use as personal protection during a pandemic. To reduce the pile of mask waste, it is necessary to carry out waste management. One of them is the management of mask waste can be done on campus. A total of 33 respondents strongly agreed on the need for mask waste management on campus. The method used by UNS to manage masks is the Dumask program. id. Dumask is a solution for managing personal protective equipment waste from the community, not clinical medical waste. However, currently not many UNS students know about the program. Based on the questionnaire data, it is known that 33 respondents have never heard of Dumask. Only 9 respondents had heard of Dumask. Currently Dumask at UNS is only available at the UNS Mesen Campus and UNS MIPA Faculty. A total of 22 respondents were very willing to participate if Dumask existed in each faculty. So it is necessary to provide each faculty so that students can participate in the Dumask program.

3.2 Dumask (dropbox used masks) as a solution for mask waste on campus

Using masks has become a new habit for today's society since the Covid-19 pandemic. Medical masks are considered more effective and safe to use as personal protection in preventing the Covid-19 virus. Medical mask waste is often mixed with domestic waste which may have been contaminated with disease and has the potential to be hazardous (Wilujeng, 2021). Medical mask waste is included in the category of non-recyclable waste so it must be disposed of or processed directly at the waste management site (TPS). In the Regulation of the Minister of Environment and Forestry Number 56 of 2015 concerning Procedures and Technical Requirements for B3 Waste Management from Health Service Facilities, it can be seen that mask waste is categorized as medical waste that requires special handling. Community behavior in disposing of mask waste plays an important role in increasing the amount of medical waste as a form of lack of awareness of protecting the environment. Medical waste such as masks from Covid-19 must first be separated from other waste and then carried out further treatment or processing before being disposed of in the domestic trash (Nugraha, 2020).

However, to ensure that contaminated waste does not pose a hazard to the community, it usually needs to be steam sterilized, burned, or chemically disinfected before being transported to a landfill. The Covid-19 virus can survive on the

surface of the mask for about 3-4 days. This is of course dangerous and can threaten the health of waste collectors and processors. The Covid-19 Task Force conducted a survey and uncovered the fact that around 80-90 percent of medical mask users throw their masks in domestic trash or anywhere else. In addition, the public's ignorance and indifference to the handling of mask waste is also caused by the lack of places to accommodate used mask waste. There is a need for socialization to increase awareness and educate the public regarding the regulation of mask waste management to prevent environmental pollution (Pratama et al, 2021).

In response to this problem, Universitas Gadjah Mada (UGM) collaborated with Sebelas Maret University and the Bandung Institute of Technology (ITB) to create the Dumask (Dropbox Used Mask) program to reduce the impact of waste on the environment in the form of a medical waste management system of disposable masks and gloves. Dumask comes from the Indonesian Collaborative Research Program (PPKI) which starts from February-October 2021. Dumask has the basic ingredients of cardboard boxes and stainless steel containers with an affordable manufacturing cost of around 50 thousand rupiah. This price will certainly be cheaper if it is mass produced. For one Dumask box, it has a volume of 30 liters which can accommodate about 500 masks or used gloves. The Dumask program began by collecting mask and glove waste using boxes that had been placed in several locations. Until now there have been 2 Dumask points available at Sebelas Maret University, namely at the Faculty of Mathematics and Natural Sciences UNS and UNS Mesen Campus.

There are special applications and websites to monitor the development of dropbox, when the dropbox is full, a notification will appear on the application and website. Furthermore, there will be officers who come to take the dropbox to be sealed and the medical waste inside will be destroyed using high-temperature thermal technology with pyrolysis and incinerator methods. The collection of mask waste can be done in two ways, namely, put it in the dropbox provided or it can be sent directly by the community to the manager Dumask. Dumask can be sent from all over Indonesia with a maximum weight of 1 kilogram, shipping costs will be borne by the sender. Dumask can be a solution for managing mask waste on campus as a preliminary treatment of B3 waste and is expected to be adopted by local and provincial governments as a real contribution to environmentally friendly medical waste management during the Covid-19 pandemic.

3.3 Relationship of Environmental Awareness with Intentions Participating in the Dumask program on Campus

Awareness is an act of behavior in which a person feels free from pressure and is fully aware to do what he wants. For example, environmental awareness, environmental awareness is an action or attitude that is directed to understand the importance of a healthy, clean environment and so on. There are several factors that can affect environmental awareness, namely ignorance, poverty, humanity, lifestyle (Gabriella and Sugiarto, 2019). This ignorance can be interpreted that someone does not know knowledge about the environment so that it can cause someone to be unaware of the importance of the environment, therefore this ignorance affects environmental awareness. Poverty is a condition in which a person cannot fulfill his needs. Therefore a person is more concerned with his needs than responding to environmental issues or environmental awareness. The next factor is humanity, this humanitarian factor means human nature that humanizes humans, which means that someone will pay

attention to things that can save many humans and do not harm other humans, so that the higher one's sense of humanity, the higher the awareness of the environment. The last factor is lifestyle, if someone has a green lifestyle then they will pay attention to what they are doing to the environment.

As a student, it is very important to be aware of the environment. This awareness of the environment can be interpreted as pro-environment. Pro-environmental behavior is an action used to minimize environmental damage or to improve environmental conditions (Gea et al., 2014). Environmental awareness among students of Universitas Sebelas Maret (UNS) regarding medical mask waste is still lacking but interest in participating in the processing of medical mask waste is quite high. The environmental awareness of UNS students was obtained from a questionnaire of 40 UNS students. Environmental awareness in this study focused on the treatment of mask waste carried out by Dumask. Unfortunately Dumask in Surakarta is still only available at UNS, namely at the Mesen Campus and the Faculty of Mathematics and Natural Sciences (FMIPA), even though the interest of UNS students to participate in Dumask is very high, namely 22 respondents very willingly, 7 respondents willingly, 11 respondents with normal, 2 respondents are not willing. The high environmental awareness is probably caused by the four factors mentioned above. Dumask has an influence in reducing medical mask waste with 8 respondents answered very influential, 18 respondents answered influential, 15 respondents answered normal, and 1 respondent answered very not influential. So it is necessary to develop the Dumask program in every UNS faculty, even better if it is throughout the University.

3.4 The inhibiting factors in the implementation of Dumask at the Campus

Dumask are a program for collecting mask and gloves waste using boxes, by making applications to monitor dropboxes and their incinerator. This Dropbox can be placed in several locations and if the box is full of trash it will provide notifications through applications and websites. Next, the officer will come and take the box and the medical waste will be destroyed by heating at high temperatures at the Recycling Innovation House (RINDU) facility belonging to Gajah Mada University. environment and take advantage of the existing potential. Although the Dumask program has begun to develop in several campuses, Dumask is not free from various obstacles. One of the inhibiting factors in implementing Dumask is because dropbox is only available in the Surakarta and Yogyakarta areas. Currently, Dumask.id is only available at 18 points around the Surakarta and Yogyakarta campuses. The Dumask program still has a narrow reach, because it is still constrained by human resources and costs when expanding its reach.

On the other hand, the inhibiting factor for implementing Dumask is in the manufacture of cardboard boxes. It is quite difficult to find the manufacture of custom cardboard boxes with large capacities in Jogjakarta and Surakarta. The speed of box production also depends on the speed of the box company and workshop, because the materials for making Dumask are cardboard boxes and stainless steel containers. In addition, another difficulty that must be faced is inviting students to throw trash into the dropbox provided, especially the waste of masks and gloves. There are still a few students who know the existence of this dropbox. Based on the questionnaire data, currently not many UNS students know about the program. It is known that 33 respondents have never heard of Dumask.

Only 9 respondents had heard of the Dumask program. So it is necessary to provide each faculty so that students can participate in the Dumask program. Dumask can be sent from all over Indonesia with a maximum weight of 1 kilogram and shipping costs will be borne by the sender himself. The hope is that Dumask can be immediately adopted by regional and provincial governments, and become a real contribution in environmentally friendly medical waste management during the Covid-19 pandemic.

3.5 An alternative strategy in building student awareness of the management of mask waste in the pandemic era

The existence of a pandemic due to the Covid-19 virus has brought many changes, one of which has an impact on the education sector (Artha et al., 2021). This situation raises new problems for the environment, such as the waste of disposable masks and gloves increasing drastically and starting to threaten the environment. Masks made from polypropylene plastic which are classified as waste that is difficult to decompose and are increasingly piling up along with the increase in community activities during the pandemic. One of the dangers of a pile of mask waste is that it is difficult to degrade so that it can disrupt the soil ecosystem and aquatic biota. Mask waste that is not managed properly can transmit disease to people around it because masks are included in infectious waste (Axmalia et al., 2021). In conditions like this, students can have an important role in understanding and realizing healthy behavior in using masks and the management of mask waste as a precaution against environmental damage. Students need to make changes in behavior so that they hope to provide solutions as people who trigger change. As an advanced generation, students should have a high concern for support and early anticipation of increasingly severe environmental damage. Students have the opportunity as actors green campus who can be used as an alternative to campaign for public awareness of waste, especially mask waste during the pandemic. Socialization and education related to the management of mask waste can be started from around, such as family, partners, and friends.

4. Conclusion

From this study it can be concluded that environmental awareness regarding mask waste based on a questionnaire to 40 UNS students is somewhat lacking. This is because there are still many respondents who do not apply the proper disposal of masks even though they have applied to use masks when outside the home. For the handling of mask waste on campus, there is a Dumask program, but there are still many respondents who do not know about the program. This is because there are still few Dumask points, which are only around the Yogyakarta and Surakarta campuses (18 points), the difficulty of making boxes, and the difficulty of inviting students to support the program. However, after knowing Dumask respondents have a high interest in participating. Therefore, as students, they must make good changes so that they can create a green campus.

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Attachment

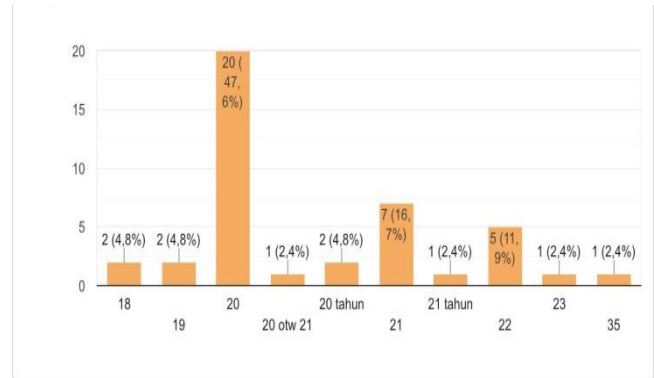


Fig.1 Age range of respondents

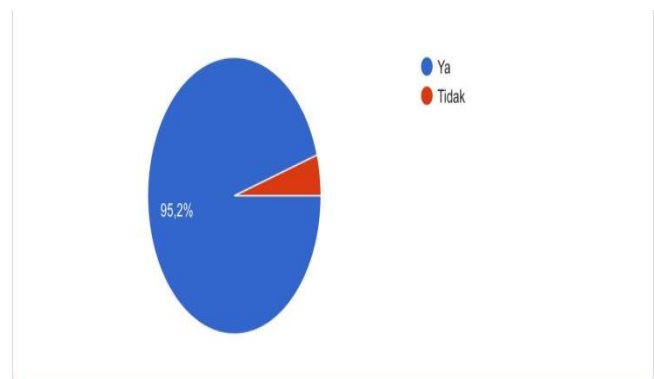


Fig.2 Opinion about mask waste including as B3 waste

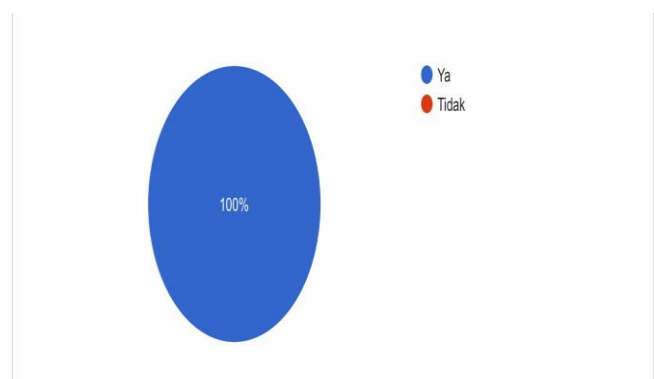


Fig.3 Opinions about using masks when outside the house

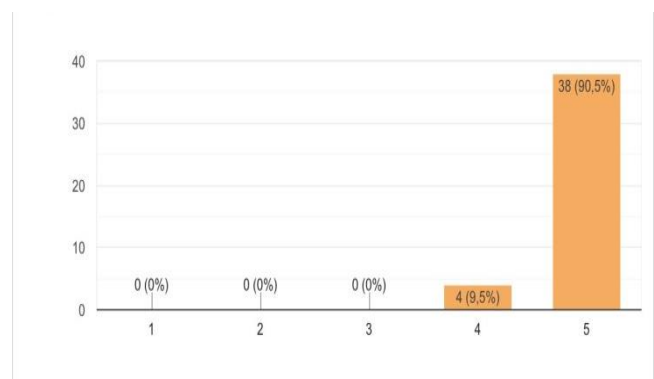


Fig.4 Opinions about the use of masks have become a new habit during the pandemic

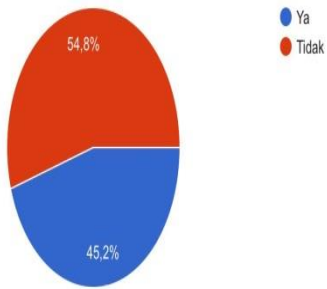


Fig.5 Level of understanding how to properly dispose of masks

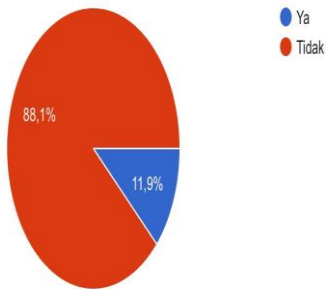


Fig.6 Students opinion on whether they disinfect masks before throwing them away

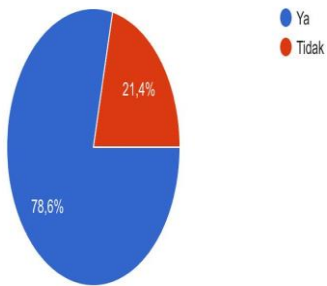


Fig.7 Students opinion on whether they tear the mask off before throwing it away

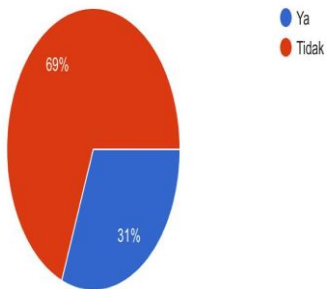


Fig.8 Students opinion on whether they collect masks before throwing them away

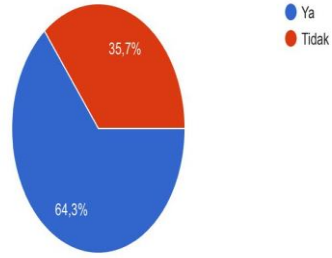


Fig.9 Students opinion on whether they dispose of masks in the right place

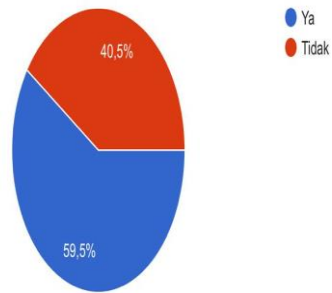


Fig.10 Students opinion on whether they wash their hands after disposing of masks

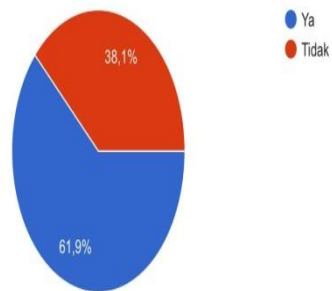


Fig.11 Opinions about the increase in mask waste during the pandemic

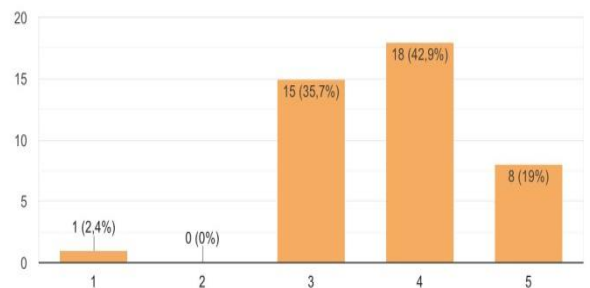


Fig.12 Opinion on the effect of the Dumask program in reducing mask waste

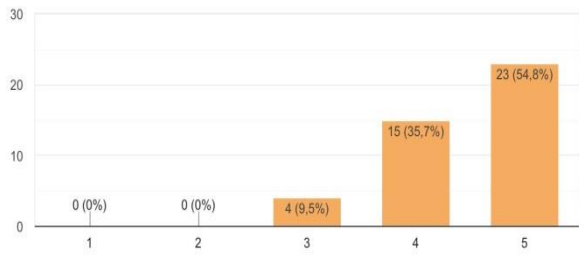


Fig.13 Opinions about the use of disposable medical masks as an effective and safe personal protection during a pandemic

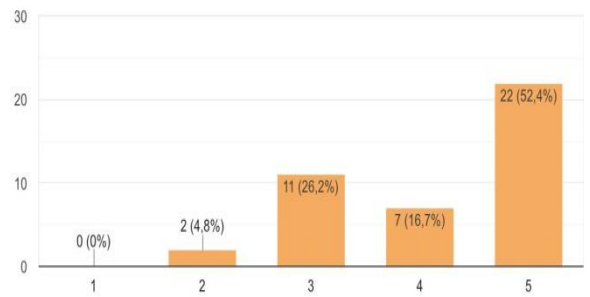


Fig.16 Students level of intention to participate in the Dumask program on campus

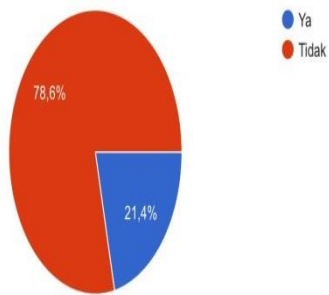


Fig.14 The level of students understanding of the Dumask program



Fig.17 Dumask (dropbox used masks) on campus

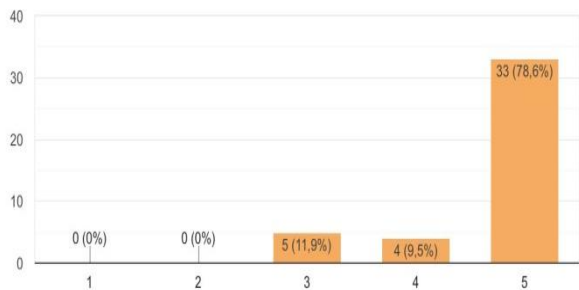


Fig.15 Students opinion about the need for mask waste management on campus



Fig.18 Dumask (dropbox used masks)