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Under the Mask

Drawing the Vitality
of History from the Changes of
COVID-19 Face Mask



Hamburger Papiere zur Designtheorie
und -forschung an der HFBK Hamburg

DENKEN ÜBER DESIGN

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Drawing the Vitality
of History from the Changes of
COVID-19 Face Mask

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Under The Mask

It has become self-evident that humanity is living in unusual and unstable times today. In just a few months, COVID-19 has crossed borders and oceans, claimed tens of thousands of lives, infected millions of people, and forced billions of people to confront the chaos of the world, the turmoil of society, and the helplessness of individuals.

If a symbol could embody the confusion, fear, and anxiety generated by the Corona virus's current spread, perhaps the mask can serve as a representation. The mask began to be used almost immediately after contagion was identified, first in Asia and later in Europe and America. Wearing a mask could block out part of the virus to protect the body, acting as a barrier, so it became one of the most coveted and highly scarce items.

A large number of different types of masks have emerged from the epidemic. Medical masks were the most recommended masks by experts, but since the global chain was broken due to border partitioning in the epidemic, there was hardly help for the moment's urgent need. So D.I.Y. masks for citizens to take the initiative to mitigate the crisis and help themselves emerged, a practice of citizen participation in society. At the same time, photos of people wearing masks appeared on various social media. The virus was invisible, and the masks became a tangible representation of the virus. Therefore, there was fear and discrimination against some minority groups. Faced with social injustice and vulnerability, fashionable masks, full of human concern and social solidarity, were created. The series of masks' changes represent a confrontation with our imminent fears, hidden desires, and inability to protect ourselves. COVID-19 created chaos, but it also sparked a wave of creativity and world solidarity.

Therefore, the mask has many meanings. It stands for the epidemic, for safety and protection, for global, for localized self-help, for protest, for solidarity, for fashion trends, and capitalism. The mask is also used in economic and political struggles and has a specific socio-cultural significance. To some extent, these masks' meanings appear more distinct than the efficacy

of protection against disease. While this may seem out of scope for designers who are more motivated by practical values, it still cannot be ignored for these emergent cultural processes.

All design influences our culture and society; similarly, with their respective systems and values, culture and society influence why designers design, how they design, and what they design. There is an ongoing interaction between design and the designed, between people and the designed world.¹ Design is an aspect of production, the result of decisions made by the maker of a product. It is a way to understand why goods are the way they are. Similarly, when looking at products as social connections, to examine what happens when they circulate in the world, it is the subject of this thesis by examining the role and changes of masks, it is possible to identify and uncover new solutions to new problems and requirements raised by practice, to explore the needs and problems that each type of design mask represents in practice to focus on and be alert to, to learn from experience to prepare more adequately for the future, to take a look at the whole process of the epidemic and use design's ability to act as a link to connect and sustain different fields and populations and to arrange reasonable and practical response solutions.

This thesis hopes to provide the redemptive power of history for a world in an unstable and unknown disaster by analyzing each type of mask's applications and drawbacks. In the design world, many people seem to ignore or disregard the historical record of design, caught in the trap of reinventing innovation, locked in the present cycle of imitation, imagining that they are designing the future.² Covid-19 responds to this phenomenon, and design needs to take responsibility for what it does; design needs to be more authentic in this crisis-ridden world, design needs to face up to its role and use its capabilities wisely and resist in concert with others. COVID-19 is not the last disaster we will encounter, and in the event of a possible second wave of disasters or other emergencies, these experiences and insights can guide us to make more thoughtful and appropriate preparations than this one, making historic recommendations for the future.

¹ Annemiek van Boeijen. Unmasking the Mask. <https://www.tudelft.nl/en/stories/articles/unmasking-the-mask>

² Fernando Galdon, Paul A. Rodgers & Craig Bremner. (2020). A DESIGN HISTORY OF THE COVID-19 VIRUS. Published by Lancaster University. p. 12-20.

The “ineffective” design in the epidemic

In the face of the problems and challenges of human society and the nature in which they live, what can design do? In addition to being a means of satisfying people’s aesthetic needs and promoting the development of industrial production, design, at a deeper level, as a part of symbiotic co-prosperity with human civilization and an essential bridge between thinking and creation, should play a role with greater responsibility and commitment in the face of the various crises encountered by humanity. To respond to this question, it is necessary first to understand the meaning of design.

The word “design” has many interpretations and is a group of words. According to Victor Papanek, the design is a conscious and intuitive effort to give meaningful order. All people are designers, and we are designing at almost any time. The design must be a creative, highly innovative, multidisciplinary tool that serves people’s real needs;³ John Morrison and John Twyford argue that design is an act that gives life some meaning, especially when it promotes the well-being of people or contributes to the natural world. At that point, the design is least valuable when used for controlling or deceptive purposes;⁴ Tony Fry argues that design at its most basic level is a pre-determined practice of applying imagination that precedes bringing “something” into reality. As such, it is a decision (a unique choice), form (material or immaterial), and direction (agency)-all other attributes (function, aesthetics, use), though of varying importance, are secondary. Design goes beyond design education, disciplinary boundaries, and professional practice. It is intrinsic to the mind and human action.⁵

Design is used in a variety of contexts. Its boundaries, uses, good and bad, cannot be summarized. Corresponding interpretations sometimes stem from the times’ prevailing attitudes, as in the Bauhaus period when design was an interface between artistic thinking and industrial technical logic.⁶ Sometimes it comes from a commercial perspective, as in Raymond Ferdinand Loewy (1893-1986), the first generation of commercial designers active in the United States, where the design was seen as the optimum between refined taste and

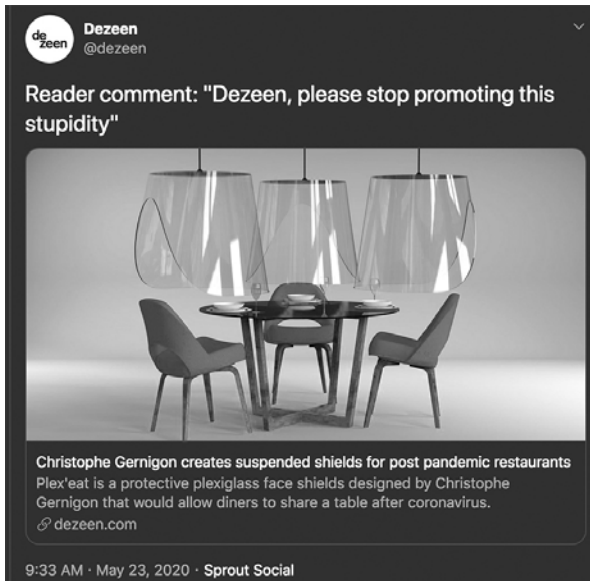
commerce (the MAYA approach⁷).⁸ Sometimes even stemming from unpredictable disasters.⁹ The use of design is flexible and versatile. It can be nuanced in the concrete form of a product or magnified to the abstract concept of a social dimension, varying according to how the word is used and interpreted in different contexts. New meanings are also emerging, and the boundaries are getting wider.

These design studies expand on the ontology of design and the use of design. On the one hand, it expands the pluralistic thinking about design, which is not just a new definition of design from a theoretical perspective but can be integrated into design practice. On the other hand, the study of common problems can be solved in a multidisciplinary way, thus avoiding that a problem has been repeatedly studied in a single field or has become a classical problem, while it is yet to be explored in another field, thus contributing to a more comprehensive and simultaneous exploration of the problem.

The corresponding designers, therefore, are not limited to the traditional design field either. As Ezio Manzini says, we are all designers in a world undergoing a rapid and dramatic transformation, which means people have to put into action the design skills. It is a way of thinking and acting that requires caution, reflection, and strategic awareness. For designers in the field of design, their task is not only to use their talents in the past, but to be the only expert in other areas they are not familiar with, but to act as a “facilitator”, working side by side to find the ultimate design answer.¹⁰ Therefore, both professional designers and other design workers need to re-examine their way of working and working.

In general, the design is nonlinear, unstructured, distributed management, and adaptive. It is difficult to predict what disciplines or fields design will intersect with in the future to create new disciplines or new design fields. The development of design is like Kevin Kelly’s analysis of social systems, which is an artificial living system with adaptable, evolvable, resilient, and flexible, elasticity, infinity, novelty, but also non-optimal, uncontrollable, and novel, uncontrollable, unpredictable, unknowable, non-immediate and other defects.¹¹

During the epidemic, several product designs to protect against the spread of the virus emerged worldwide. In May 2020, architecture/design critic Kate Wagner posted a critical comment under a Dezeen story about a French designer Christophe Gernigon’s proposal for protecting restaurant diners by suspending transparent hoods over their heads, calling on Dezeen to stop spreading similar “stupid” designs. In her design blog, Wagner further explained that many of these cases were speculative, claptrap, and useless designs that were more like “PR-chitecture” for designers.^{12 13}



Michael Jantzen proposes 'social distancing aids' made from four collapsible plastic rings. Source from: designboom

The misuse of design capabilities to create desperation and ineffectiveness for a real and urgent epidemic is one reason these designs are criticized. Kate Wagner argues that some designers use such crises for self-promotion and generate clicks and revenue but provide little or no benefit to the people in danger and on the front lines.¹⁴ For example, the wearable device pictured in the image that keeps social distance, even though it is a concept design, does not convey a designer's positive attitude toward solving a dilemma but instead demonstrates its top-down arrogance and lack of empathy. There is no consideration of the rationality of use, feasibility, user feelings, the real plight of the epidemic and what is needed, and a series of other issues that the design should think about and its responsibilities. The use of Photoshop and a few marketing words to highlight the designer's capabilities is an ironic and abusive use of design skills, and Kate Wagner calls such designers "tone-deaf art world creeps."¹⁵

The ability to design needs to be used with care. The art historian John Heskett once euphemistically criticized the design, implicitly stating that it is becoming vulgar and confusing due to modern society's "expression" aspects.¹⁶ It is not that design has become baffling, but its vulgarity has become inexplicably confusing when one avoids the fundamental reality that design can also be an object of criticism while being a social critic. In its fundamental sense, the design constructs a real relationship between human beings and the ideal world.¹⁷ This approach can be used as a critique and a satire, but we must not forget that it is an act that requires constant reflection and careful management.

The "heroic" self-perception of designers may be one of the reasons. From another perspective, both designers and design websites express that people in design are trying to get involved in the epidemic. In the design world, designers are used to solving other people's problems from the designer's point of view, but is a single perspective too one-sided or too authoritarian?

Multidisciplinary collaboration could lead to a more comprehensive and better solution. From the early days of Victor Papanek¹⁸ and Ken Garland¹⁹, who called for designers not to spend so much time and energy in the service of capitalism, to the subsequent proliferation of labels such as "social design" and "critical design", each iteration has demonstrated the designers' increasingly urgent but abstract concern for the "big issues" of the times.²⁰ Designers concern with the entire social system and trying to make a vision of the future. Could designers cope with such a vast range of topics? Bruce Mau, author of "renown Incomplete Manifesto for Growth", once responded in a 2015

interview when asked if design thinking could solve big picture problems like the environment, “Designers cannot solve all problems and must accept their inability to do anything about it and do the best they can.”²¹

Similarly, Ruben Pater, a professor at the Department of Communication at the Design Academy Eindhoven, commented on the What Design Can Do (WDCD) Refugee Challenge, suggesting that designers and all those involved should understand the refugee crisis in its entirety and not simply as an isolated design issue. More than simply designing a shelter, there is a complex political and military context behind it.²² It means that designers alone cannot take on all the responsibilities, nor is it possible to solve a problem comprehensively. Designers should be clear about their role and scope of competence; otherwise, they may cause more damage and be reduced to excuses and weapons.

Today’s world has become so complex that the design provided for it is equally full of uncertainties and variables, and all past successes may need to be re-examined and revised. So, how does design correspond to the global human destiny and the current epidemic? Who used the design? What did the designers do? How has design changed in the face of a sudden and complex crisis?

3	Victor Papanek. (1984). DESIGN FOR THE REAL WORLD: Human Ecology and Social Change. USA: Panthenon Books,	10	Ezio Manzini. (2015). Design,When Everybody Designs: An introduction to Design for Social Innovation. The MIT Press, p.2	18	Ibid.
4	John Morrison & John Twyford. (1993). Design: Capability and Awareness. Longman	11	Kevin Kelly. (1994). Out of Control: The New Biology of Machines, Social Systems, and the Economic World, America. HACHETTE BOOKS GROUP. p.34-37.	19	Ken Garland.(1964). First Things First.
5	Tony Fry. (2020). CLIMATE CONFLICT DESIGN. TREVALLYN, Tasmania : Design Philosophy Provocation Press, 36.	12	Research from website, https://mcmansionhell.com/post/618938984050147328/corona-grifting-a-design-phenomenon	20	Silvio Loursso. (2019). On Design and Disillusion. In P.A. Rodgers and Craig Bremner(Eds.), Design School: After Boundaries and Disciplines (pp.108-115). Malaga, Spain: Vernon Press.
6	Victor Papanek. (1971). DESIGN FOR THE REAL WORLD: Human Ecology and Social Change. USA: Panthenon Books, p.31	13	Research from website, https://www.dezeen.com/2020/05/26/architecture-critic-kate-wagner-architects-designers-coronagrifting-coronavirus/	21	Bruce Mau. https://www.whatdesigncando.com/stories/things-bad-thats-good/
7	“Most Advanced. Yet Acceptable.” which means that Loewy sought to give his users the most advanced design, but not more advanced than what they were able to accept and embrace.	14	Ibid.	22	Ruben Pater. (2016). Treating the refugee crisis as a design problem is problematic
8	Victor Papanek. (1971). DESIGN FOR THE REAL WORLD: Human Ecology and Social Change. USA: Panthenon Books, p.33	15	Ibid.		
9	Alice Rawsthorn. (2013). Hello world: Where Design Meets Life. p.13	16	John Heskett. (2002). Design: A Very Short Introduction. Oxford University Press. p.1		
		17	Victor Papanek. (1971). DESIGN FOR THE REAL WORLD: Human Ecology and Social Change. USA: Panthenon Books.		

Case study

– masks in different periods of the epidemic

This section explores design in different contexts by analyzing the masks' changes during different epidemic phases.

COVID-19 (Coronavirus disease 2019) was a global pandemic outbreak caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). The outbreak came to global attention in December 2019 in Wuhan, Hubei Province, People's Republic of China, and was followed by a global pandemic in early 2020 in many countries worldwide.²³

Wearing a mask is a crucial measure to prevent the spread of the new coronavirus and infection. The human-to-human transmission of this virus is mainly through respiratory droplets: when an infected person coughs, sneezes, or speaks, tiny liquid particles are released from the mouth or nose and are breathed into the body by people through the air, thus causing the spread of the virus.²⁴ That is why masks are a crucial measure to inhibit transmission and save lives. Therefore, both ordinary cotton masks, disposable masks (e.g., medical-surgical masks), and N95 (anti-haze masks) can protect against bacterial and viral attacks to varying degrees. In the current epidemic, having a mask is like having an extra barrier of protection.

Therefore, the importance of masks will inevitably result in a shortage of supplies for masks. The World Health Organization says global demand for medical masks has skyrocketed 100-fold since the outbreak, and prices have risen 20-fold.²⁵ Statistics from the journal *Environmental Science and Technology* show that approximately 194 billion masks and gloves are currently used each month globally, with mask consumption topping out at billions per day.²⁶ The high demand for masks has been described as a "strategic material" in an epidemic. Even the government is calling on people to reduce the number of masks by going outside. Therefore, industries related to masks are looking to upgrade. Attempts are being made to make masks more productive and functional to ease the epidemic's spread again.

As a product under human design, the design of the mask is inseparable from it. Whether in the appearance, function, or use of the product, its

change at the time of the epidemic means that the design also changes, such as the design's focus, the design's expression and so on. Therefore, this chapter explores the role and changes design played in this crisis by analyzing masks.

The logic of this chapter analyzes the changes in masks according to the temporal development of the epidemic. The prominent representatives of the pre-epidemic, mid-epidemic, and post-epidemic periods are analyzed separately: disposable medical masks, D.I.Y. masks, and fashion masks. Analyze the concerns of designing masks in different contexts and the corresponding designs' advantages and disadvantages. Hopefully, it will provide some case pavement for future generations in exploring the role and development of design in the future.

Pre-epidemic period – medical masks

Medical masks are at the top of protective masks, and therefore the most urgently needed. As a product in the field of industrial product design, an analysis of its role in the epidemic and the strengths and weaknesses it exhibits can provide lessons for product design in the same field, as well as lessons for how the field can be used appropriately in similar scenarios in the future.

Design of medical masks

- People in the medical field as the design lead, and continuous improvement.

The origin of modern medical masks' birth comes from the 18th century in surgery on infection awareness.²⁷ In 1674, Antonie van Leeuwenhoek first observed microorganisms;²⁸ in 1861, Louis Pasteur confirmed the presence of microorganisms in the air;²⁹ and in 1867, Joseph Lister suggested that "microorganisms can cause wound infections."³⁰ The development of microbial theory and the understanding of infectious diseases in the seventeenth and nineteenth centuries cleared the final hurdle for the medical mask's invention.

The world's first medical mask was invented in 1897 by Dr. Johannes von Mikulicz of Poland. In order to avoid infection caused by splashing droplets from breathing and coughing into the patient's wound, he combined the above theory and tied a piece of gauze to his cap with two strings to cover his face in order to cover his nose, mouth, and beard and play a barrier role, which was the first generation of a mask.³¹ When the mask was first invented, it was rudimentary and straightforward, and the difference between convenience and comfort with modern masks was huge, but it brought human beings "wearing" into the door of modern masks and became a powerful tool for preventing infectious diseases.



Mikulicz's mask, foto: Paul Thompson, www.nationalgeographic.com

Simultaneously, doctors worldwide made their improvements to masks, which became more comfortable and convenient.

Improvements on oral and nasal contact: In 1897, a surgeon in England cut gauze into rectangles and erected a frame-shaped thin wire bracket between the gauze, leaving a specific gap space between the gauze and the mouth and nose, which solved the shortcomings of the mask of poor breathing and easy wetting by saliva.³²

Improvements in wear: In 1899, Paul Berger, a French surgeon, made a mask made of six layers of gauze cut into quadrants and sewed the bottom of the mask to his surgical gown, turning the collar up when he used it. He then improved the design by making the mask free to be tied. A looped band was used to attach gauze to the ears or the back of the head.³³ The modern shape of the mask was then born. With medical experts as designers, masks have more credibility and authority. As doctors, they have a better understanding of the efficacy of masks and the appropriate materials, and they have the appropriate knowledge. Moreover, as the masks' primary users, their designs meet the real needs when they are used. The material and design of masks are constantly being improved to enhance their efficiency and response to crises further. Earlier medical masks were usually made of several layers of gauze, sometimes with a layer of waterproof material and fixed with a metal frame, and most medical masks were washable, and the metal parts could be sterilized, thus facilitating their repeated use over time.³⁴

- Material and technology innovation, disposable medical masks are more convenient and widely used.

Disposable medical masks made of non-woven or synthetic fibers emerged in the 1930s and gradually became popular in the 1960s.³⁵ After years of development, modern disposable medical masks have greatly improved manufacturing technology and protective efficacy to provide excellent protection.³⁶

Disposable medical masks have been refined in terms of efficacy and comfort. Unlike traditional medical masks, these masks fit snugly on the face, filtering not only exhaled air but also inhaled air better while preventing the spread of droplets. The fabric material that plays a role in these effects is prone to deterioration and failure in the disinfection process, so these masks can only be used once.

It also decreases labor and material costs and meets the demand for use. Reuse of masks requires timely cleaning and disinfection, increasing labor and material costs, and the risk of infection. However, disposable use can significantly reduce these problems and facilitate hospital supplies management. With advances in industrial production, disposable medical masks' production has become more rapid, standardized, and sterile. In China, for example, in



Variety of masks used in a 1961 cosmetic-surgery procedure. Sources: Allan Grant/Getty Images, <https://shoutoutjmu.com>



2019, an automated production mask machine can produce up to 100 masks per minute, while the annual demand for various types of protective masks in China is around 800 million, with enough production to meet the demand.³⁷ Industrial mass production brings economic efficiency, high productivity, and high production precision.

Drawbacks of the epidemic

- Previous production scales and methods can not meet the demand, causing social panic.

The culprit of the epidemic, which led to an oversupply of masks, was the lack of responsiveness of an efficient but rigid modern supply chain.³⁸ Global supply chain breakdowns have become the new buzzword in the public consciousness. The previous production chain of masks was not sufficient to support the current huge demand, and even with the emergency addition of a new production chain, they could not be produced without material supply.

Mask material production is difficult to accelerate and expand. The primary material for disposable medical masks is polypropylene fiber.³⁹ This material's production is widespread, but the process is demanding and is used in baby diapers, feminine hygiene products, disposable wipe-on cloth clothing machines, automotive and construction industries. However, the heavy machinery to produce the material requires significant capital investment, and a production line can take one to three years from fabrication to commissioning. As a result, melt-blown non-woven is a specialty fabric, and there are a limited number of companies manufacturing the material globally. So it is difficult to increase the supply of masks quickly during an epidemic or to find companies that can switch to this production process in a reasonable amount of time without significant new investment.⁴⁰

Globalization has caused industrial partitioning and difficulty in manufacturing masks. According to a report in Korea's Daily Economy, South Korea needs to import melt-blown non-woven fabrics from China to meet the nation's use. Korea's production of the melt-blown non-woven fabric is 11 companies, which can only meet 60% of Korea's needs.⁴¹ China, a large manufacturing country, was also unable to meet demand during the outbreak. China is a significant producer of surgical masks, accounting for about half of the world's production.⁴² However, because China was the epicenter of the first COVID-19 outbreak, its production was insufficient to meet its own needs. China tried to increase the production chain of masks, but the melt-blown fabric needed to be imported from Germany, with a lead time of 7-8 months and a further 1-2 months for installation and commissioning. Specialized training of staff is required, which is time-consuming. Therefore, disposable medical masks are in crisis.

Overall, COVID-19 reveals the inadequacy of previous production models and global supply chains to respond to pandemic-induced public health crises and the flexibility and agility of product supply chains in crisis times. Industrial products previously relied on systems that were vulnerable to upheaval and caused unpredictable damage. As one of the critical supplies for pandemic preparedness, it should have played the role it was designed to play during the outbreak, but instead, the acute shortage caused public panic to run high. The future design should consider the life cycle of the product in detail and include the product's countermeasures in the face of the crisis. The contemporary design should be responsible for the ecological cycle and promptly deal with unpredictable crises.

- Production of crazy expansion, ineffective manufacturing products.

Medicine has been transformed by consumer culture—what *Life Magazine* enthusiastically named “Throwaway Living”⁴³ in 1955.

The mask industry grew explosively because of the shortage of masks in the pre-epidemic period, so many industries switched to masks' production. In the second two months of the outbreak, almost every day, a company announced the successful development of a fully automated mask machine, and the production of mask machines went into a frenzy. For example, on May 7, Xi'an Aerospace Engine Company claimed to have successfully developed the KN95 mask machine in less than 30 days, with a daily output of 90,000 units.⁴⁴ Similar news is staged every day, and people take it as an honor to develop the most significant daily production of mask machines in the shortest time.

However, the quality of the equipment manufactured in the short term was a big disappointment. Reviewing the rapid development of the mask machine industry during the epidemic could be considered a drawing that triggered the madness. Starting in February, a design drawing of the mask machine was circulated in the industry, which led some companies to spend much money to buy it, so many companies claimed to have successfully developed the mask machine. Many manufacturing companies took the drawings and copied them, buying the parts to assemble the mask machine by themselves. However, the performance of the mask machines they manufactured was unstable, the output was low, the actual capacity was less than 30%, and they needed precise cooperation from the technicians on-site to operate correctly.⁴⁵ In Shenzhen, China, a manufacturing company developed a KN95 mask machine in 10 days, which did not produce properly. By the time the equipment was recommissioned, the mask market was saturated, and the equipment turned into a pile of

scrap metal.⁴⁶ Then millions of small factories throughout China without any experience, and how much garbage has been manufactured?

Similarly, the overproduction of masks has resulted in overproduction and expiration. Now that the epidemic is largely under control in China, there is a surplus of disposable masks in demand. The retail price of medical masks has dropped to as low as 0.39 dollars (about 0.05 euro per mask) below cost, and stocks are backlogged and sold at a loss. The population hoarded many masks for protection, but excessive hoarding also leads to a certain amount of wasted resources without considering the product's shelf life. History keeps repeating itself, and there is no way to predict when the crisis will come again. It is impossible to hoard a large number of items every time. Otherwise, the waste of resources and the loss of energy will be unimaginable.

In participating in consumption, design has been addressing the issues of stimulating demand, market competition, and consumers, but economic issues have overshadowed ethical and environmental issues, which have become one of the causes of the relationship between man and nature.^{47,48} Design can have disastrous consequences if it focuses too much on the transient benefits of solving a practical problem at the expense of using the object itself.

- Focus on efficacy and use, ignoring the number of uses and the treatment after use.

“Disposable” becomes “reusable”, and the hygienic design of masks fails under an epidemic. Due to the lack of masks and the fact that the epidemic has been around longer than expected, the public has been forced to reuse medical masks. Various methods of “disinfecting” disposable masks have been circulating on the Internet, and several academic institutions are actively exploring methods of disinfecting disposable masks to ease the mask supply crunch. The FDA has also previously granted emergency use authorization for innovative personal protective equipment (PPE) disinfection technology, and each CCDS (Critical Care Decontamination System) from Battelle is capable of disinfecting 80,000 N95 masks per day. The same mask can be disinfecting up to 20 times with minimal impact on the mask's protective function.⁴⁹ However, disposable masks were not initially designed for reuse, and some of the earlier designs for reuse and improved germ protection have not been incorporated into modern disposable mask designs. Reusing disposable medical masks also creates resource consumption and pollution emission problems in reuse,⁵⁰ and the most crucial anti-bacterial effect is not yet known.

Remedying the problems of the present by overspending on the future

is not a good choice. Sociologist Lucius Burckhardt argues that this would be counterproductive.⁵¹ When a medical mask fails to meet the present's needs, a new measure is created to remedy the problem, and this new remedy may prove to be a problem by other events. This cycle will not effectively solve the problem but will only bring forward the future crisis. Counterproductivity occurs when an invention is used in a way that opens a gap in the overall system, and another isolated invention covers this gap. The sum of subsequent inventions then gives the counterproductivity of the whole system.⁵²

Multidisciplinary cross-collaboration is the only way to make the design more comprehensive.⁵³ Medical professionals design disposable medical masks focusing on efficacy and perception of use but do not have a comprehensive view of the life cycle and possible effects of the mask and cannot address problems that arise outside their field. The future challenges are too complex and daunting to be solved by using only one discipline. In addition to involving designers or engineers in the process, there is a need to bring together users, customers, patients, and other stakeholders to become designers to address critical issues and develop viable ways to improve their current experience or co-create something new.

Second, there is a balance between disposability and universality that design needs to do well. For the time being, we cannot do without masks for the sake of others and our health considerations, much less altogether avoid disposable items and achieve zero waste, but it should not be at the expense of the planet. In addition to responding to the specific problem at hand, design should also consider the whole system cycle and consider the positive and negative effects of design in a comprehensive and detailed way. It is essential to focus not only on the immediate dilemma but also on the whole planet and the future.

- Ignore disposable products' characteristics, turn the "health crisis" into an "ecological crisis".

Because of its single-use nature and limited duration of use, medical masks inevitably generate huge waste, which poses a burden on the natural ecology. A large number of discarded disposable masks is causing severe plastic pollution in the ocean. A report entitled "Masks on the Beach: The Impact of COVID-19 on Marine Plastic Pollution", released by OceansAsia 07.12.2020, says that in 2020, the oceans will be filled with approximately 1.56 billion masks, which will result in an additional 4,680 to 6,240 metric tons of marine plastic pollution. It will take up to 450 years for these masks to break down

and slowly turn into microplastics.⁵⁴ Negative impacts on marine wildlife and ecosystems and maybe just the tip of the iceberg.⁵⁵ It also negatively affects fisheries and tourism, costing the global economy an estimated 13 billion dollars a year.⁵⁶ In pandemics, medical supplies that protect human lives turn a "health crisis" into an "ecological crisis" for the entire planet.

Waste management systems are overwhelmed. According to the journal *Environmental Science and Technology*, statistics show that about 194 billion masks and gloves are currently used worldwide each month, with mask consumption topping out at billions per day.⁵⁷ More than the pollution caused by burning masks, the genuine concern is that those masks and other health protection products thrown anywhere may cause secondary pollution. Before the pandemic, waste management systems in many countries were already struggling to keep up with over-consumption and wasteful lifestyles. With the increase in personal protective equipment used by the general public, these systems are even less able to cope.

Humans are the perpetrators and the ultimate bearers of violence. Human behavior is behind environmental pollution and ecological damage from production, distribution, and then reckless disposal. When runaway garbage dirt enters the food chain, the first to bear the brunt is human health. Experts have confirmed in experiments on mice that microplastics have toxic side effects on the brain and that the bisphenol A in microplastics also interferes with reproductive hormones and affects human fertility.⁵⁸ The blame for these grievous sins cannot be attributed to disposable materials' unique nature but should be designed with more care and comprehensiveness.

Today, wearing a mask is a legal requirement in many public places worldwide, and it looks like it will remain so for some time. The crisis is short-

Discarded face masks may be mistaken by sea creatures for prey and eaten. By Stely Nikolova, <https://puebla-es.acuariomichin.com/desechar-cubrebocas-no-llegue-a-los-oceanos/>



lived, but its effects are ongoing and irreversible ecological mutations. Design and manufacturing have the potential to create value and the risk of destroying it. Only by paying sufficient attention to and recognizing the complexity of this relationship will it be possible to make this result a creation that reflects value.

Discussion

Through the above analysis of the advantages and disadvantages of disposable medical masks, it can be seen that:

- Talents in the professional field could design and improve their professional products more precisely. However, in addition to focusing on the function and ease of use of the product, it is also necessary to consider the number of times the mask product is used and the secondary pollution caused after use. The large consumption of materials, packaging, and disinfection quarantine chemicals has caused environmental stress. In addition to solving new problems by using a new design to advance the future to solve the immediate problems of helplessness, it is more important to improve the root cause of product design.

- Industrialized mass production and a globalized supply chain can efficiently produce medical masks, but mask product design ignores the whole industry chain synergy problem in an emergency environment. In the case of an unexpected public health crisis, the massive gap of masks makes it difficult to effectively collaborate with the industry upstream and downstream in a short time. The epidemic exposed the dilemma of mask manufacturers and the problems of raw materials, auxiliary materials, and production equipment suppliers of masks, which posed a challenge to logistics and transportation, bank funds, and manual multi-party synergy and innovation.

- Although the extreme expansion of production can stabilize the people and maintain society's functioning to a certain extent, excessive and substandard production can waste resources, ecological pollution, and human beings' backlash.

As the current pandemic illustrates, our economy is fragile and dependent on a complex environment. Industrial civilization needs to consider the benefits of resilience and be flexible and agile enough. In response to the problems with mask products during this pandemic, it is important to improve and broaden the life cycle of mask products in a comprehensive manner in the face of similar situations in the future, not only to achieve a balance between universality and disposability but also to implement industrial synergy and sound production and manufacturing in crises. Professional product design al-

ways comes after the event, as it takes time to think, experiment, and produce. Then, how to cope with the gap period before getting a new solution also needs to be included in the scope of design thinking.

At the same time, is there another way to design for change at the root of the problem than just fixing the problems in the system all the time? With the WWF warning that humanity will soon face a new pandemic,⁵⁹ imagine a world that gets stuck not every hundred years but every few years, and how do we choose?

In the epidemic – D.I.Y. masks

As an autonomous act of the public due to the lack of medical masks, D.I.Y. masks are an act of public participation in society and can be included in the field of participatory social design. The analysis of its role in the epidemic and the strengths and weaknesses can provide experience for future social design in similar practices.

Most of the cases in this sub-section are from China. As the first country to be affected by the epidemic, the population and society's reaction to a sudden disaster is natural. At the same time, as one of the major producers of masks, China is already a well-equipped country compared to other regions, and the situation that occurs in the face of a sudden disaster highlights the problems more sharply and is more valuable for analysis. As a spontaneous means for the public to respond to a crisis, D.I.Y. masks transform over time and events change. Therefore, to see the changes more clearly, this section uses a chronological order of development for the analysis.

Pre-D.I.Y. masks, the unavoidable choice

- Scarcity of masks, public emotions stirred.

The market resources for masks were called upon by the government, and the public questioned the government's ability. During the early stages of the epidemic, a poll was launched on the Internet, "Could you still buy masks there?" Three hundred thousand people participated in the poll, of which 263,956 said they could not buy masks, and about 86% of them could not buy masks. A woman from Shanxi went to three pharmacies in a row to buy masks but was told that any epidemic prevention items were sold out and told that masks were now given priority to those on the front line of the epidemic fight, so there was not much stock offline. Meanwhile, online shopping malls and online pharmacies are showing out of stock. The online platform canceled people's orders for masks because the government is collecting supplies for epidemic prevention.

“I feel despondent”, she said. “Hospitals are treating the sick while we cannot buy masks and may get sick. What a bizarre cycle! I do not know how the country’s resource allocation works, but unfortunately, people like us cannot even buy ordinary disposable masks.”⁶⁰

In the early stages of the outbreak, the government channeled many resources to the hardest-hit areas and the epidemic’s front lines,⁶¹ but it also failed to consider each individual’s needs. There was a great deal of fear and anxiety among the people who could not buy masks. The government’s decision to allocate resources was understood rationally as the best way to focus on the problem and maximize benefits. However, the fear of not being able to guarantee their safety and being unable to do anything about it still made the public feel emotional and doubtful about the social system.

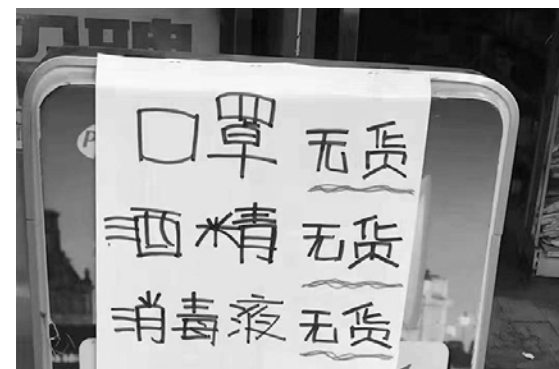
Likewise, the high degree of professional segmentation in modern society is one reason for the high public sentiment level. In the past, the amicable relationship between the public and the government depended on the social system’s proper functioning. However, the coronavirus taught humanity a shocking lesson that in a matter of weeks, the virus could suspend economic systems in all parts of the world and stop systems that were thought to be impossible to slow down or change direction.⁶² And the fact that people were only clear about their domain led to the fact that most people could not understand when the system failed and could only blame the system for not working.

Also, the public is deeply influenced by the culture of society and habitually waits for government assistance. On the one hand, China’s long-established submissive mindset and the subordinate nature of citizens believe that managing public crises is the government’s responsibility, subconsciously making themselves the object of crisis management and not having a strong sense of consciousness avoid and prevent crises.⁶³ On the other hand, the government’s lack of publicity and education for the public to deal with public crises has led to a lack of common sense in crisis response and crisis resolution, which is one of the reasons for the public’s hoarding of large amounts of supplies, weak awareness of participation, and low ability to participate.

- Civilian self-help, D.I.Y. masks are taking shape.

People faced this paradox: if they want to go out, they must wear a mask. However, there is no mask at home; they must go out to buy a mask, but without a mask, and how to go out?

Public D.I.Y. masks to help themselves in the face of the dangers of the virus and the lack of supplies. Figure 1 shows a cab driver wearing a “mask” made of grapefruit peel during a routine temperature test on February



The picture is an informational sign from a pharmacy that said: “Out of stock of masks
Alcohol out of stock
Out of stock of disinfectant”
Sources: https://www.sohu.com/a/371211772_477212

4, 2020. He tied half of a grapefruit peel with a red string and wore it on the face, with some small holes for normal breathing. The cab driver explained: “As a cab driver, during the epidemic every day to carry large numbers of passengers, passengers are mobile, I am afraid that passengers carrying the virus will infect me, and then through me to others. I do this to protect passengers, but also to protect themselves, now the market mask shortage can not buy the mask, so I had to use the grapefruit peel homemade this ‘environmental protection mask’ temporary emergency.”⁶⁴ Figure 2 is a 95-year-old man met by the netizens in the community hospital when dispensing medication. The elderly man said he could not buy a mask, and he used half an orange peel to make a mask. He joked that this kind of mask with a moist inner layer could beautify the skin, have a beautiful and generous appearance, and prevent bacterial infection. And also with an orange aroma, very fresh.⁶⁵

However, the effectiveness of such D.I.Y. masks against epidemics is minimal. The public does not recognize it as an effective tool and has a negative attitude toward D.I.Y. It was also believed that domestic mask manufacturers should be able to produce masks quickly and did not need to learn to make masks with much effort. At this time, D.I.Y. is a masking tool to prevent others from feeling fear, and it is “better than nothing, just get over it” for the usefulness of the mask. This homemade mask is more intentionally funny and ironic than its actual function. The social meaning of “mockery and disappointment” at the government’s inability and the manufacturer is stronger than the mask’s design and protective meaning.

- Invalid D.I.Y. masks with insufficient relevant knowledge and skills.

The public’s lack of knowledge about masks is one reason for the production of invalid masks. D.I.Y. masks in this period are still very “stylized” and “simple imitation”. They had a superficial understanding of the practical utility



Public's ineffective masks made of various materials at the beginning of the outbreak, Google Image Search

of masks and thought that as long as they kept their mouths and noses out of the way, there was no problem anymore. However, masks cover the nose and mouth and filter and absorb harmful substances through multiple materials layers. There are also specific requirements for materials. However, in the early days, masks' knowledge was not fully understood, so people made their masks in various ways. The materials used were lady's bras, the outer skin of fruits, plastic bottles, plastic bags, towels, diapers, and other materials, made by simple sewing and pasting, which could not play an essential protective role.

The public has some life experience but cannot use it very well. Nor can it be said that the masks made from these materials are hilarious muddled. Take the grapefruit peel mask as an example. Grapefruit peel has a thick layer of soft inner flesh, similar to the traditional thick gauze mask. The maker chose grapefruit peel to show that he has specific life observation and association power, but not necessarily a correct judgment of the effect, first do it. Perhaps this thinking is the key to distinguish the success of D.I.Y..

Furthermore, the pursuit of modern development in the past is one reason for the unfamiliarity between the public and do-it-yourself production. As China is a big consumer and producer country, D.I.Y. has never been an option because of its cheap and diverse products. Because China's consumption patterns are changing so quickly, the policy and perception that "all development indicators in China's cities should compare to those of developed countries in Europe and the United States"⁶⁶ may also be one of the reasons why these folk creations do not have the opportunity to produce and extend their content.

D.I.Y. masks in the middle, "citizen supply chain"⁶⁷ to mitigate the crisis

- The spread of expertise makes D.I.Y. masks effective, and the public and government work together to fight the epidemic. The public donated

medical masks to the front line and made D.I.Y. masks to protect themselves. The epidemic is not going away as quickly as people expected but is fighting a constant battle. The number of confirmed cases kept increasing, hospitals had limited carrying capacity, and they soon faced a supplies emergency and had to ask the public for donations of masks and other medical supplies.⁶⁸ The public then decided to donate all their medical masks. So the public also had to make masks through D.I.Y. to ensure their safety. At this point, the attitude towards D.I.Y. was much more positive than the previous attitude of Kitsch, hoping to use their power to relieve the pressure of society and be able to face up to and accept D.I.Y. now.

Professionals share the open-source of making masks, hoping that all people will D.I.Y. masks maintain social stability. Pictured is a nurse Aihua Liu at Wuhan Hospital who made D.I.Y. masks that meet surgical medical standards with other nurses in order to leave medical masks for her colleagues on the front line when the hospital was short of supplies, which could meet the needs of other medical staff masks in the hospital.⁶⁹ She thought that the main difficulty of D.I.Y. masks is the pattern making, which needs to consider the protection function and comfort of D.I.Y. masks and needs to be tested repeatedly. Finally, their D.I.Y. masks passed the medical device company's performance test, and the verification report proved that their D.I.Y. masks meet the medical-surgical mask standard. To relieve the pressure of the whole society, they published the production method on the Internet. WHO also released an instructional video on how to make D.I.Y. masks on the Internet.⁷⁰ Aihua Liu feels that if the public can master the method, it may help the general public relax. If they make more D.I.Y. masks, more medical masks can be left for frontline health care workers, and the whole epidemic can be brought under control more effectively.⁷¹

The public learns the knowledge and makes masks with their own needs. By explaining the functions and materials of masks by experts and international health organizations on the Internet, people's understanding has gradually improved and have made various kinds of masks with certain defensive functions. The picture shows a gentleman who learned the D.I.Y. method from the Internet. Combining the materials he had, he used an absorbent, skin-friendly light-colored T-shirt for the inner layer of the mask; a disposable towel for the middle layer, which could be changed in time; and a non-absorbent knit shirt for the outer layer of the mask. He also sent out his production tutorial on the Internet, hoping to give others some reference and help.⁷²

Public D.I.Y. practices show that individuals need to acquire know-

ledge in order to produce valid objects. It is clear from several cases above that people can complete masks that meet the requirements under limited conditions, provided that they are able to produce them according to the standard requirements. The sharing of expertise and the network's spreadability are important factors for D.I.Y. to spread and thrive. Moreover, D.I.Y. masks' production is not primarily about learning and understanding but about creating substantial contributions to solve social problems.⁷³ Repairing and fixing systemic problems such as healthcare deficiencies. Openness, collaboration, and the value of co-production are critical to making critical decisions.⁷⁴ When knowledge is shared, people acquire skills and agree on a willingness to use their power to help society, and there is a bottom-up synergy with social systems to fight off viruses. Therefore, open-source sharing, public collaboration, and co-production are essential for D.I.Y. emergency manufacturing.⁷⁵

- Vulnerable people could also get adequate protection.

The high price of masks during the epidemic caused some difficulties for vulnerable groups such as refugees, the elderly, the infirm, and the homeless, who lacked the means to maintain personal hygiene. As in the figure, the elderly are more vulnerable to the epidemic due to their physical resistance and poor physical function. They are more behind in information and have even more difficulty purchasing masks. Many have meager incomes, and the high price of ordinary medical masks and the expenses corresponding to several depleted replacement rates a day may be a burden for these low-income people, which puts them all at risk.

Therefore, the popularity of effective D.I.Y. masks is crucial for them. During the epidemic, Azra Akšamija, a member of the jury of the UNESCO Sharjah Prize for Arab Culture, launched the Co-Mask global initiative to inspire people to make their masks, and through this to spread hope, a spirit of humanity and solidarity, and adequate hygiene measures. The project provides instructions in several languages to make their masks at home. The materials and tools are simple and easily accessible for making masks. The staff also translates and adapts the content of the making guide to the local context to address cultural aspects or shortages of specific materials for free use in refugee camps, poor communities and so on.⁷⁶

The vulnerable groups can also protect themselves by learning and making D.I.Y. masks even when they cannot buy medical masks. The dissemination of effective D.I.Y. masks can ease the general public's material troubles and give more comprehensive and extensive attention to other easily neglected groups in society, giving them help and comfort.

The limitations and requirements of D.I.Y

- D.I.Y. has a limitation on the scope and duration of use.

D.I.Y. masks are not as effective as disposable medical masks. There are still deficiencies in infiltration, sealing, and hygiene. It is also challenging to unify materials, production, and quality, so there is no accurate value and standard for epidemic prevention, which is not conducive to long-term supervision and control. Therefore, D.I.Y. masks are adapted to replace medical masks in short-term supplies shortage and market supply failures. Also, suspend the panic caused by these factors. Public efforts can provide more solutions to the problem, but they are not substitutes for mass manufacturing.⁷⁸

Also, D.I.Y. cannot manufacture other more technically demanding products, such as ventilators. Ventilators are also a desperately needed supply during an epidemic, but the public cannot move to manufacture that type of equipment independently. Even if they could do so, clinical approval of these devices is critical from a practical and ethical standpoint. Therefore, it is neither possible to obtain approval, and the public's efforts may be wasted; even if the public is allowed to use their own manufactured ventilators, there is a perceived risk of failure and perhaps a moral condemnation of the public that entails severe liability.⁷⁹ Therefore, when the public associate's social challenges with D.I.Y., it needs to assess and verify the feasibility of D.I.Y. before exploring how to address the problem.

Therefore, this thesis does not argue that D.I.Y. can be applied at all levels and a long-term solution to the shortage. However, it is possible to reflect on this emergency D.I.Y. mask's impact on society and learn experiences from these citizen responses.

- Irrational D.I.Y. can feed consumerism and sap public enthusiasm. D.I.Y. in the epidemic has proven its ability to provide help to social problems temporarily. Therefore, the reserve of D.I.Y. ability and knowledge needs to be accumulated in daily life, and public engagement in hands-on production in daily life needs to be improved.

However, irrational D.I.Y. has hidden consumption and saps the public's motivation to D.I.Y. American artist Lisa Anne Auerbach's article "Don't Do It Yourself" shows that the revolutionary ideals of "empowerment harm people's lives and the planet they live on." Although D.I.Y. encourages people to do it themselves, people need to buy tools and materials, which burden the public economy. Similarly, ineffective D.I.Y. consumes materials, destroys nature, creates garbage, and requires more human and material re-

sources to eliminate mistakes and consume people's passion and creativity for doing things on their curiosity and patience for engaging with the real world, like people's D.I.Y. behavior at the beginning of the epidemic, cutting up plastic bottles and clothes to make masks did not provide adequate protection and deepened anger towards the government, people, and things related to the virus and added to the public's negative emotions. It is not to say that the public has no chance of trial and error at all, but it needs to treat the resources with more appreciation and consider the impact more carefully. A D.I.Y. mask may seem like a small object weighing only a few grams, but once it rises to the level of universal production and design, it is infinitely magnified.

Therefore, D.I.Y. should learn to cooperate. Share tools and materials with others, allow others to help and compensate for abilities and knowledge that one does not possess. Embrace frugality, knowledge, common resource property and skill sharing,⁸¹ rather than allowing capitalism to turn the spirit of D.I.Y. into another shopping opportunity.

Discussion

From the analysis of the above three subsections, it is clear that the public D.I.Y. masks have the following advantages and experiences.:

- universal participation, immediate self-help in the short term, and more timely response to problems in crisis contexts.
- The neglected vulnerable groups can also protect themselves.
- Open-source sharing of knowledge and skills, using the advantages of the Internet, so that D.I.Y. masks have real epidemic prevention effects.
- Synergy with top-down governance approaches to counteract the epidemic.

At the same time, public engagement has demonstrated shortcomings in the practice of this epidemic, such as:

- public distrust in their capacity and dependence on the market and government for relief.
- Lack of knowledge and skills.
- Irrational D.I.Y. behavior can sap the enthusiasm of public engagement and even feed capitalism.

For possible future disasters, some guidelines can be learned through this practice. Public crises can have a direct impact on the public, and since public crises are sudden when it is impossible to solve or alleviate the crisis in a short term effect, the public's own ability to cope with the crisis as a sufferer is crucial, and it is also about the effectiveness of crisis management. For example,

matters such as developing the public's trust in themselves daily and learning to cooperate and share with others. While the government calls on commercial manufacturers to accelerate production, public engagement can also be considered. The traditional top-down approach to governance can be powerful and far-reaching in solving problems, but it takes time and material resources. Moreover, in today's fast-moving society, where unexpected problems come one after another, public engagement is one way to mitigate problems before there is enough time to wait for a professional design to solve them.

The future of social progress should not be guided solely by technological and economic advances—it should not go in one direction. While disrupted manufacturing during an epidemic or other global disaster may lead to a more resilient system to supply needed products, open-source distributed citizen engagement may allow for a more resilient social system as a whole. As Ezio Manzini's concept: "Society and design in a connected world in transition to sustainability. A world in which everyone must constantly design their way of being, whether they want it or not."⁸² It means that the public should also value and use their abilities to contribute to the world's future. As in the case of this epidemic, the lack of medical masks has made it necessary to D.I.Y., from ineffective orange peels to effective masks, using available resources and simple technology to achieve "folk self-help". At this level, the design is a way for everyone to use, and the role of design becomes the transfer of professional knowledge, providing a platform for universal D.I.Y. and participation to relieve personal and social pressures.

Post-epidemic period - fashion masks

In the post-epidemic period, masks are not out of the picture. A paper in the journal *Nature* predicts that the coronavirus could become a long-term epidemic.⁸³ Even with the development of a vaccine, there is still much uncertainty. The emergence of new mutant viruses leading to increased viral transmissibility and the continued worsening of some local outbreaks will pose an even larger challenge. In the foreseeable future of life, the mask becomes an accessory that must be worn, just like cell phones and glasses.

Therefore, fashionable masks with declarations of personal fashion and social care have become a cult favorite. As a design item in the consumer field, analyzing its role in the epidemic and its strengths and weaknesses can provide lessons for product design in the same field and how it could wisely use it in similar scenarios in the future.

Care of fashion masks

In the early days of the epidemic, masks became a representation of fear and stigma besides being an epidemic prevention device. In daily life, some patients would be advised to wear masks to protect themselves from infection. In some Asian countries, such as China and Japan, many people also wear masks daily as a hygienic habit.⁸⁴ However, as the epidemic began, medical masks evolved to signify the virus and collective fear, causing stigmatization and racial discrimination.⁸⁵ People of Asian ethnicity were stigmatized for wearing masks as carriers of diseases that threatened others' safety.⁸⁶ Some people initially refused to wear masks, seeing it as an assertion of authority, dehumanization, and confrontation.⁸⁷ The Covid-19 crisis not only raised concerns, creating new challenges to the infrastructure of daily life and practical solutions to collaborate globally at an interactive level, it also demonstrated that the persistence of social inequality demands attention and care. The masks expose the inequalities of the world we live in today and amplify the voices of those who are silenced.

In order to remove the stigma and discrimination of masks, there is a need to actively communicate the social significance and moral value of wearing masks. It could base on a sense of social responsibility and widespread solidarity against a common threat. For example, the main purpose of wearing masks is to control the source, and the wearer is portrayed as altruistic or even a protector.⁸⁸ As a result, masks take on a new symbolic meaning, gradually transforming into a new social norm in the development of the epidemic,⁸⁹ going from anxiety inducer to fixation for people, from fear of wearing a mask to fear not having one.⁹⁰

The masks show people's care and support by becoming fashionable. In one questionnaire, participants were asked what the design of the mask meant to them, and some felt that a fashionable mask could regulate their mood because medical masks were too serious; they wanted the mask to be neutral and not have any negative emotional overtones; one participant liked his rainbow mask because he felt that "the rainbow seems protective", enhancing his confidence through the meaning of the pattern.⁹¹ The appearance of the mask is vital in generating a sense of trust and security. The mask is both an interface and a surface. Therefore, what is printed on the mask affects the meaning it generates and regulates emotions.⁹² Decorating an object is an act that can escalate or downgrade an event,⁹³ and the decoration of a mask can directly influence the willingness to wear it and solidarity, allowing the public to accept

better the act of wearing a mask and enhance the inclusiveness of other cultures. The masks' designs vary, but the underlying spirit is the same: viruses are ugly, but we can respond beautifully, and choosing a stylish mask makes a step in a friendlier direction.⁹⁴

As a result, many designers and fashion industry players have used their abilities to design and manufacture fashion masks full of human care, and people are willing to buy fashion masks. The masks make all wearers equal under isolation and embrace different social cultures and inspire compassion. It makes the public less indifferent to the society that maintains their lifestyle and more open to others' voices. It is not a stopgap measure but an integral, uncuttable, and ever-changing part of human coexistence.⁹⁵

Disadvantages arising from the epidemic

- Relying on unstable events, fashion masks "fail".

The government encouraged the production of cloth masks in the early stages of the epidemic. For example, the Centers for Disease Control and Prevention (CDC) urged the public at the beginning of the epidemic to wear cloth masks made of fabric in public or in other situations where social distancing might be challenging to achieve.⁹⁶ That instantly opened the door for the design and production of fashion masks. Whether it was a luxury brand or a designer brand, or a retail store, each brand produced and sold its own fashion masks. Fashion masks were instantly the public's first choice. Etsy, a fashion sales platform, even changed its home page to be about masks. The company revealed that between the weekend of April 4-6, 2020, people searched for masks on the site an average of nine times per second, totaling more than 2 million searches, and Etsy's supply surged, selling nearly 20,000 fashion masks.⁹⁷

However, later in the epidemic, cloth masks were no longer allowed in order to control the spread of the epidemic more strictly. For example, on January 25, 2021, the German federal and state governments agreed on stricter restrictions on epidemic masks, requiring people to wear medical masks, such as surgical masks and KN95 (or FFP2) masks, when traveling on public transportation.⁹⁸ In the future, the public will no longer be allowed to wear fabric masks on public transportation, and they will not be able to use scarves or clothing instead of masks to cover their mouths and noses. Fabric masks and D.I.Y. masks will no longer be permitted in some public places, and most of the products of fabric fashion masks will become unused supplies. It means that the fashion masks previously produced in a frenzy for care purposes will become a waste of resources and useless for actual epidemic prevention.



Collina Strada Fashion Face Mask With Bows. Collina Strada is a fashionable platform for climate awareness, social awareness, change, and self-expression—all of which come together in the designer's beautifully made face masks.
Source from: <https://www.refinery29.com/en-us/2020/05/9782883/stylish-fashion-face-mask-coronavirus>

Designer Sefiya Sjejomaoh makes colourful masks to match her personality.
"When you come out in a stylish mask or with an accessory such as this, it doesn't seem as though we're fighting a war. It seems more fun", she said.
Source from: <https://www.bbc.com/news/world-52691164>

During a changing epidemic, policy changes are also unpredictable. Some countries are constantly adjusting and developing new policies to deal with the virus. The policy shift of cloth masks from encouraging production to disallowing their use is only a few months. To do design and production on an unstable event, we should consider the situation and changes that may occur at any time, and need the design participants to stay cautious and sober, even for the sake of social stability, and should maintain a balance between resource consumption and controlling the epidemic, rather than “rob peter to pay paul”, which wastes both resources and the public’s money and patience.

- Fashion masks feed capitalism.

The care of fashion masks can easily become a slogan for capitalist hype. The design industry has always encouraged the public to embrace anything new and different. The hybridization of technology and art has accelerated consumers’ whims, creating two controversial drawbacks: style and disuse.⁹⁹ Designers and entrepreneurs quickly responded to the market gap by proposing various new symbolic functions for masks. Slogans such as equality, care, individual expression, and environmental friendliness resulted in thematic types of masks for men, women, children, different cultures, premium masks, and reusable masks.¹⁰⁰ The masks became a new way to express one’s identity

and social status. Dan Altmann, a Chinatown Market founder, mentioned that people seem to collect masks rather than buy them as needed. People can buy more different brands of masks for less money than normal apparel, and masks have become a convenient access point between the public and brands. “We underestimated the desire for people to own multiple brands. People often place more than one mask order and can even buy five or six.”¹⁰¹

Entrepreneurs exploited the fear and goodwill generated by the public during the outbreak for their purposes and profits. Some brands have adopted a “buy a mask, get a free mask” model, in which for every mask a consumer buys, the business will give a mask to a frontline worker. The Collina Strada Fashion Face Mask with bows pictured above, for example, sells for 70 dollars a mask, and with the purchase of this mask, the merchant will provide five medical masks to New York City paramedics.¹⁰² There are even companies that turn masks into service by offering mask subscriptions starting at 10 dollars. To make such sales tactics less sinful and guilt-inducing, some designers will even cover up his capitalistic desires by using civic-minded terms. Take this quote from MaskClub, for example: “Founder Trevor George’s 8-month-old son was scared to see him wearing a mask, so he decided to make it less terrifying by creating masks with recognizable patterns.”¹⁰³

The characteristic of capitalism is that it creates a standard, and people take this artificial standard as the object of their desires and willingly fulfill those desires.¹⁰⁴ Under the banner of solidarity and care, capitalism allows people to release their goodwill through purchases that allow people’s desires to control themselves—to allow them to control themselves. It may seem like a free choice in obeying oneself, not forced by others. However, this is perhaps the hidden strategy of the capitalist market. Not exactly coercive and violent control; it creates standards, creates desires, and controls people through their desires.

People are getting more enthusiastic about masks, but whether this is positive remains to be seen. It is undeniable that each fashionable mask also represents labor and income, both were scarce during the epidemic, and the sale of fashionable masks can help a small company get moving. However, whether designers or entrepreneurs or influencers should realize that in addition to making their industries profitable and receiving social attention, it is important to notice the energy and contagiousness that these roles bring with them. Capitalism that overly exploits the pain of the epidemic and misuses resources to increase consumption is the origin of what started it all. Entrepreneurs and designers should seek a more sensible way to achieve a balance between economy and environment.

Discussion

For the above analysis of the advantages and disadvantages of fashion masks, we can see that:

- It is necessary for the care of individuals and groups. The design comes back to the product itself. There is no denying that the design does stand for human care, but it also feeds into capitalism.
- Fashionable masks will be ineffective due to policy changes, wasting resources over an unstable event. Therefore, designs for such conditions need to be more careful.

The mask is protecting the self from the virus and protecting others, protecting the lives of those we do not know. In addition to being a means of immunity, the mask measures our relationship to the radical other and how we deal with such radicalization when we encounter it, it is a signal of civility, solidarity, and caring. Wearing a mask allows us to infuse fundamental ethical ideas into how we inhabit the world through our contact with material objects.¹⁰⁵ Therefore, in the face of an unpredictable future, design needs to pay attention to the spiritual dimension of society and culture in addition to the physical and rapid response to the virus.

The mask is a tangible medium that one can wear and consume and reflect and think about. It is both a fashion object that concretizes our contemporaneity and a counterpart that can handle and capture different instances. In the realm of fashion, the mask can quickly find an ideal host and market, but it is also vulnerable to capitalist overstatement and malicious sales disguised as “solidarity and care”. Therefore, the design must balance thinking about promoting the idea of care in a greener way, even if it is to save an industry that is immensely affected by the epidemic.



Street-side retail stores sell fashionable masks.
Source: website, <https://www.telegraph.co.uk/news/2020/04/19/german-regions-force-citizens-wear-masks-following-success-city/>

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Conclusion

A mask is an object that possesses multiple meanings. In its external physical manifestation, the mask blocks viruses and protects life; internally, it demonstrates the fragility of social civilization, economy, life, and ecology, evoking the perceptions and feelings of the world, others, and self, and attempting to limit and dictate our behavior on this planet. The masks demonstrate the vulnerability of products in their current contexts, the vulnerability of the systems that make and use them, and the vulnerability of the lives that are protected and reshaped,¹⁰⁶ and rethink and redefine the nature of terms such as global chains, public engagement, policymaking, and social order.

This thesis focuses on the various types of masks that emerged from the epidemic. A comparative analysis of the reasons for its birth, concerns, factors that should be present, and the advantages and disadvantages of each reveals that a single virus caused the epidemic, but the effects it brought about acted on all aspects of the world. The different types of masks correspond to different aspects of the epidemic's complex problems, exposing the missing and concealed problems in current society. The crisis has given rise to many ingenious and collaborative behaviors that even the strictest embargoes could not limit. The analysis in it shows that whether it is thinking about the future of the global chain, the role the public assumes in society, or the care for all life and other corners that have not yet been explored and analyzed, design exists in different contexts as different roles, forms, and scales, and the subjects and objects of design, the participants who design and are designed, and the design methods used to respond to the contexts and change flexibly.

Therefore, it is important to learn from this epidemic and reflect on how things correspond outwardly and how society constructs itself inwardly. Contingency planning for future crises is essential. The possibility of a "black swan"¹⁰⁷ event is increasing, but its specific characteristics are still unknown.¹⁰⁸ In the face of unpredictable future disasters, design needs to be careful and thoughtful about the positive and negative impacts of these solutions, in addition to anticipating the different dimensions of the ensuing problems and

providing multi-channel solutions quickly and effectively. The values of observation, openness, collaboration, and co-production are critical.¹⁰⁹ Working in synergy with different subject fields and working with all groups to resist collaboration. Beyond that, we should reflect on how to renew and innovate the current social system, changing it from within to become a more stable and secure bastion, able to fight against time and delay the end of the world.

The epidemic informs us that everything in the world is so closely intertwined that ecological, medical, and social exclusion can no longer be dealt with separately. The masks do symbolize not only the global invasion of the virus but also the multitude of exclusions that arise. If the mask in an epidemic represents a physical sign of vigilant precaution, beyond that, it reminds us that behind every mask, there is an invisible, shaky system and the world in danger, waiting to be unmasked.¹¹⁰

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