

A survey on the use of mobile phones due to COVID-19

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Abstract

The purpose of this study was to investigate the changes in the use of mobile phones due to COVID-19. The subjects of this study were those who lived in Jeju City and used their own mobile phone for more than 2 years, and were included in adult men and women aged 15 to 80 years old. The purpose of this study was explained and a questionnaire survey was conducted on 156 people who agreed. The survey period lasted from June 15 to July 4, 2020. As a result, the daily use time and function of the mobile phone, which were used more than before the occurrence of COVID-19, increased. This was a statistically significant trend ($p < 0.001$) with increasing trend after COVID-19 in all age groups. In addition, in the mobile phone function, all age groups used more 'KakaoTalk' than 'call', but it was found that only the group with less than 1 hour of daily using time used the call function a lot.

Key Words: *Mobile phone, COVID-19, Phone Function, Untact*

1. INTRODUCTION

To mark six months since WHO declared a public health emergency of international concern of COVID-19, the number of infected people is increasing worldwide. According to the WHO statistics up to today, more than 130,000 cases of COVID-19 have been reported, including 506,000 deaths. Also, sixty percent of all infections occurred in June [1]. As the cases of local outbreaks rapidly increased on June 28, 2020, the government set out a new framework and action plan at a local level to prevent, contain and manage outbreaks. According to the severity of the regional epidemics, social distance and the infection prevention and control guidance, the framework was divided into 3 steps. As the consequence of the long-term COVID-19 environment, the 'untact' culture which was characterized as keeping social distance and non face-to-face communication was emerged as the new social phenomenon[2]. Working from home, online education and web conference became the daily routine and as the consequence the consumption pattern and lifestyle faced the great challenge. Even the concert was replaced by the online show.

Even in the untact era, rapid changes are appearing in every corner of the world, such as providing online cultural performances that were taken for granted. Some say that one of the areas that has been greatly influenced by the spread of uncontact due to COVID-19 is the change in distribution and consumption systems.

This would have been possible by spreading further as the Internet technology and mobile phone specifications in Korea have been advanced, payments can be made with the diversification of mobile phone functions and the overall life can be solved online. The evolution of mobile phones is changing the way of people life as they modify adjust to crisis like Corona.

Since the mobile phone was launched in 1982, the number of mobile phone subscribers in Korea has already exceeded 60 million in 2017. According to the report of the domestic mobile communication infrastructure announced by the Ministry of Information and Communication in May 2020, the number of mobile phone subscribers was 5,613,000, and the number of mobile phones that could access wireless Internet was 6.43 million[3]. This is because the domestic mobile environment is already at the world-class level, and mobile-mediated content was developed in a various areas through the establishment of a network and IT infrastructure, as suggested by Kim Jin-kyung [4] in the past.

The function of mobile phones has evolved remarkably from 1G in the past to 5G today. Modern people living in the era of smartphones solve the whole part of life with their mobile phones and communicate with the outside world. Since it has established itself as a necessity for living close to real life, various studies have been reported. Looking at the previous papers related to the mobile phone function, Adolescent teenagers' emotional and addiction-related [5, 6], elderly-related health research [7, 8], analysis of frequency of users by function by age [9], age and hand manipulation skills in function use and related [10, 11]. Also, people with high self-efficacy perceived and used mobile phone functions well [12, 13]. However, there have been no studies on how the functions of cell phones are useful in unexpected situations like Corona. In addition, it is necessary to study how the functions of mobile phones are being utilized in real life as various functions have been developed. So, in this study, based on the fact that the mobile phone using frequency in a situation has a significant effect on pleasure [13], The purpose of this study is to investigate what changes have occurred in mobile phone use due to COVID-19 and which functions are being used more in mobile phone functions.

For the purpose of research, I will divide the following details and look at them.

Research Project 1: Is there a difference in cell phone usage time due to corona?

Research Project 2: Is there a difference in cell phone usage time by age?

Research Project 3: Which of the mobile phone functions do you use a lot?

This study investigates how close cell phone use in daily life changes by age due to COVID-19, and Among the functions of mobile phones, the purpose is to investigate the actual condition of which functions are being used more by modern people.

2. Mobile phones Function and History

The first mobile phone in Korea, which showed its first line using analog (AMPS) technology on July 1, 1988, ahead of the Seoul Olympics in Korea, weighed about 1kg (771g) and more than four Samsung Galaxy S9s (163g) with a brick phone. It was as heavy as it combined. It was said that the initial cell phone was a very expensive product, and it was equivalent to the apartment price in some areas of Seoul at the time of 1988. Even after charging for 10 hours, the phone was discharged and turned off after 35 minutes of continuous conversation [14]. However, the smartphone currently in use has undergone dramatic changes in its function and performance.

The first generation mobile communication was analog communication, and the second generation mobile communication was a digital mobile communication that appeared in 1993. The 3rd generation mobile communication was originated from NTT DoCoMo in 2001 and indicates that both voice data and non-voice data (data download, mail exchange, message transmission, etc.) can be transmitted. The 4th generation mobile

communication indicates that information can be transmitted at a rate of 100Mbps while on the move and 1Gbps while stopped. In this way, with the development of mobile communication, mobile phones have also been developed [3, 15]

In focusing on functionality rather than form, Mobile phones continue to develop with smart phones in 1996, camera phones in 2000, email phones in 2002, PDA phones in 2003, etc. [16] In short, it was the process of embedding a camera and computer into a mobile phone. As a result, the mobile phone has been transformed from a machine that communicates with each other to an information communicator that communicates various information quickly, and is a machine that is actively utilized in all aspects of life. And this change is being accelerated very quickly by Apple's smartphone, the iPhone, launched in 2007.

The era of PC mobile phones can be said to be the era of the popularization of smartphones in which computers and mobile phones are integrated. Therefore, it is the smartphone that technically defines the "PC mobile phone era". The history of smartphones almost overlaps the history of digital mobile communications.

'The key to 4G mobile communication using a smartphone is that you can freely use the Internet at anytime, anywhere at the video level. This allows you to freely communicate with people from all over the globe at anytime, anywhere on the video level [15].

3. EXPERIMENTS

The subjects of this study were those who lived in Jeju City and used their own mobile phone for more than 2 years, and were included in adult men and women aged 15 to 80 years old. The purpose of this study was explained and a questionnaire survey was conducted on 156 people who agreed. The purpose of this study was investigated by using a structured questionnaire for 156 people who agreed. The survey period lasted from June 15 to July 4, 2020.

3.1 Research Procedure

As a method of data collection, one-to-one individual interviews were conducted through a self-made structured questionnaire, and Among the 160 copies of the collected data, 156 copies were used as the final analysis data, excluding 4 copies of unstable data after verification. The selection of subjects living in Jeju City and have been using mobile phones for more than 2 years, and were enrolled in adults less than 15 years old to 80 years old.

The objectives of this study were described, and 160 subjects who agreed to the survey were surveyed. The questionnaire was composed of general information and mobile phone (4 questions), cell phone usage time and function (6 questions), and changes due to COVID-19 and information collection (5 questions). A total of 12 items were excluded, except for 2 items with an average score of 3 or less. In addition, Cronbach's (α), the internal consistency value of the questionnaire question, showed a high confidence of 0.862.

3.2 Data Analysis

The collected data were compiled using the SPSS(Ver 24.0) and were at a significant level $p < 0.05$ for the significance test of each method of statistics. Statistical significance was verified using Frequency , Crosstabs and chi-square test. and Excel was additionally used to organize tables and figures.

4. RESULT AND DISCUSSION

4.1 General Characteristics of Research Objects

Table 1. General characteristic of subjects

Characteristic	Division	Subject (N=156)	%
Gender	Male	51	32.7
	Female	105	67.3
Age	10 to 29	67	42.98
	30 to 49	45	28.83
	More than 50	44	28.29
Occupation (Job)	Student	55	35.3
	housewife	9	5.8
	employee	17	10.9
	Official	11	7.1
	Education-related position	5	3.2
	Service position	36	23.1
	self-employment	6	3.8
	Medical. Health jobs	3	1.9
Mobile phone model	Job candidate	2	1.3
	Etc.	7	4.5
	Apple iPhone	52	33.3
	Samsung Galaxy	78	50.0
	LG Mobile phone	19	12.2
Total	Etc.	2	1.3
		156	100

The general characteristics of research object were 51 men (32.7%) and 105 women (67.3%), as shown in Table 1. The age group were: 67 people between 10 to 29(42.98%), 45 people between 30 to 49 (28.83%) and 44 people over 50 (28.29%). In the distribution by age, 9 people (5.8%) in their teens, 58 people (37.2%) in their 20s, 20 people (12.8%) in their 30s, 25 people (16.0%) in their 40s, 34 people (21.8%) in their 50s, 9 people (5.8%) in their 60s and one in their 70s (0.6%) had the highest number of people in their 20s. In the subject's occupations, students (35.3%), service workers (23.1%), employee (10.9%), Official (7.1%), housewife (5.8%) were higher in order, and subject's jobs varied. In addition, the types of mobile phones in use were Samsung Galaxy 78(50.0%), Apple iPhone 52(33.3%), and LG mobile phone 19(12.2%).

4.2 Difference according to cell phone usage time per day.

Table 2. comparative analysis of cell phone usage time per day before and after COVID-19

One day usage time	Before Corona		After Corona		χ^2
	N	%	N	%	
30 minutes to less than an hour.	18	11.5	13	8.3	316.563** (0.000)
1 to 2 hours.	52	33.3	35	22.4	
3 to 4 hours.	60	38.5	57	36.5	
5 to 6 hours.	16	10.3	30	19.2	
7 hours or more.	10	6.4	21	13.4	

** p<0.001

In order to find out Research Assignment 1, the changes in cell phone usage time due to COVID-19 were investigated. The results of comparing cell phone usage time per day before and after COVID-19 were shown in Table 2. As a result, respondents who used mobile phones for 30 minutes to 1 hour per day fell from 11.5% to 8.3%, Respondents who used 1~2 hours from 52(33.3%) to 35(22.4%), those who used 3~4 hours from 60(10.3%) to 57(36.5%), and users 5~6 hours from 16(10.3%) to 30(12.9%), More than 7 hours, the largest change was from 10(6.4%) to 21(13.4%). Respondents who used within 1 hour decreased and those who used for more than 7 hours had the biggest change from 6.4% to 13.4%. also, the chi-square statistic value($\chi^2 = 316.56$) was significant in the comparison of cellphone usage time before and after COVID-19 ($p<0.00$).

Table 3. Comparison of cell phone usage time.

N=156

Before	After COVID-19				
	30 minutes~1 hour	1~2 hour	3~4 hour	5~6 hour	7hours or more
COV	13	4	0	0	1
ID-19	0	29	20	3	0
	0	2	36	16	6
	0	0	1	10	5
	0	0	0	1	8
Total	13	35	57	30	20

4.3 Changes in the usage time of mobile phones per day by age group

Table 4. Changes in the usage time of mobile phones per day by age group

N=156

Age group		Cell phone usage time per day before COVID-19 occurs.					Total
		30 minutes~1 hour	1~2 hour	3~4 hour	5~6 hour	7hours or more	
10~20s.	frequency	1	15	30	14	7	67
	% of age	1.5	22.4	44.8	20.9	10.4	100.0
30~40s.	frequency	6	14	21	1	3	45
	% of age	13.3	31.1	46.7	2.2	6.7	100.0
over 50s.	frequency	11	23	9	1	0	44
	% of age	25.0	52.3	20.5	2.3	0.0	100.0
Whole	frequency	18	52	60	16	10	156
	% of age	11.5	33.3	38.5	10.3	6.4	100.0

The researcher investigated whether there is a difference in cell phone usage time by age? The results shown in Table 4. Among those in their 10s and 20s, 44.8% of users used a cell phone for 3 to 4 hours a day, while those in their 30s and 40s accounted for 46.7% of the time. For those in their 50s or older, 52.3% of them used 1-2 hours. Overall, the frequency of users for 3 to 4 hours(38.5%) was the highest, followed by 1 to 2 hours(33.3%).

Table 5. Cell phone usage time by age group after COVID-19

Age group		Cell phone usage time per day After COVID-19 occurs.					Total	χ^2
		30 minutes~1 hour	1~2 hour	3~4 hour	5~6 hour	7hours or more		
10~20s.	Frequency	0	6	28	19	4	67	55.066**
	% of age	0.0	9.0	41.8	28.4	20.9	100.0	(0.000)
30~40s.	Frequency	5	11	15	8	6	45	87.581**
	% of age	11.1	24.4	33.3	17.8	13.3	100.0	(0.000)
over 50s.	Frequency	8	18	14	3	1	44	57.814**
	% of age	18.2	40.9	31.8	6.8	2.3	100.0	(0.000)
Whole	Frequency	13	35	57	30	21	156	37.543**
	% of age	8.3	22.4	36.5	19.2	13.5	100.0	(0.000)

p<.005* p<.000**

Table 5 shows the chi-square test results for the change in daily use time of cell phones by age group. Chi-square test results, the usage time of mobile phones after COVID-19 among teenagers in their 20s increased significantly compared to the usage time of mobile phones before COVID-19 and was statistically significant ($p < 0.001$). Even in the age group in their 30s and 40s, cell phone use time after COVID-19 increased compared to cell phone use time before corona, and was statistically significant ($p < 0.001$). Lastly, even in the fifties and older, the trend increased after COVID-19 and was statistically significant ($p < 0.001$).

4.4 According to the difference in daily usage time, the differences between the functions used are compared.

Table 6. Frequency of major function of Mobile phones according to the daily mobile phone usage time group

Function Usage time	T.C	Texts	SNS	W.V	Shopping	K.T	C.U	LL	BU	Bank	Etc	Total
	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	
30minutes~1 hour	8 (1.68)	3 (0.63)	2 (0.42)	1 (0.21)	2 (0.42)	5 (1.05)	0	0	1 (0.21)	0	2 (0.42)	24 (5.05)
1~2 hour	11 (2.31)	8 (1.68)	6 (1.26)	7 (1.47)	3 (0.63)	17 (3.57)	6 (1.26)	3 (0.63)	4 (0.84)	5 (1.05)	3 (0.63)	73 (15.36)
3~4 hour	25 (5.26)	18 (3.78)	22 (4.63)	24 (5.05)	14 (2.94)	32 (6.73)	18 (3.78)	8 (1.68)	5 (1.05)	9 (1.89)	7 (1.47)	182 (38.31)
5~6 hour	12 (2.52)	7 (1.47)	14 (2.94)	13 (2.73)	10 (2.10)	22 (4.63)	12 (2.52)	10 (2.10)	3 (0.63)	4 (0.84)	6 (1.26)	113 (23.7)
7hours or more	10 (2.10)	7 (1.47)	13 (2.73)	12 (2.52)	6 (1.26)	13 (2.73)	9 (1.89)	3 (0.63)	2 (0.42)	2 (0.42)	6 (1.26)	83 (17.47)
Total	66 (13.89)	43 (9.05)	57 (12)	57 (12)	35 (7.36)	89 (18.7)	45 (9.47)	24 (5.05)	15 (3.15)	20 (4.21)	24 (5.05)	475 (100.0)

T.C: Telephon call
 SNS: Social media
 W.V: Watch the Video
 K.T: Kakao Talk
 C.U: Content Use
 L.L: Listen to the Lecture

(Multiple selection)

Table 6 shows the results of the frequency of major functions of mobile phones according to the daily mobile phone usage time group. The main functions of the mobile phones for those who use less than an hour are calling (1.68%), KakaoTalk (1.05%), and texting (0.63%). Users for 1~2 hours were high in KakaoTalk (3.57%), calls (2.31%), text messages (1.68%), and video viewing (1.47%). Users for 3-4 hours are KakaoTalk (6.73%), call (5.26%), video viewing (5.05%), social media (4.63%), content viewing (3.78%), shopping (2.94%), banking (1.89%), Listening to lectures (1.68%), and this was similar to those who used 5-6 hours. In contrast, those who use cell phones for more than 7 hours used KakaoTalk (2.73%) and social media (2.73%) the most. Video (2.52%), call (2.10%), content viewing (1.89%), text exchange (1.47%), shopping (1.26%), other (1.26%), lecture listening (0.63%) and banking (0.42%) in order. Overall, it was found that KakaoTalk (18.9%) uses more than calls (13.89%) and texts message (9.05%), and video viewing (12.0%), social media (12.0%) were the next users.

4.5 Changes in cell phone function use due to COVID-19.

This results due to the COVID-19 out the changes to the functionality of the cell phones were as shown in Figure 3. As a result, KakaoTalk was the most frequently used function with 89.7%, followed by calls 82.1%, video (video) viewing (63.5%), text sending and receiving 56.4%, photos (46.8%), Content viewing (44.2%), social media (43.6%), shopping (39.7%), banking (32.1%), band use (19.2%), and others (17.3%) in order.

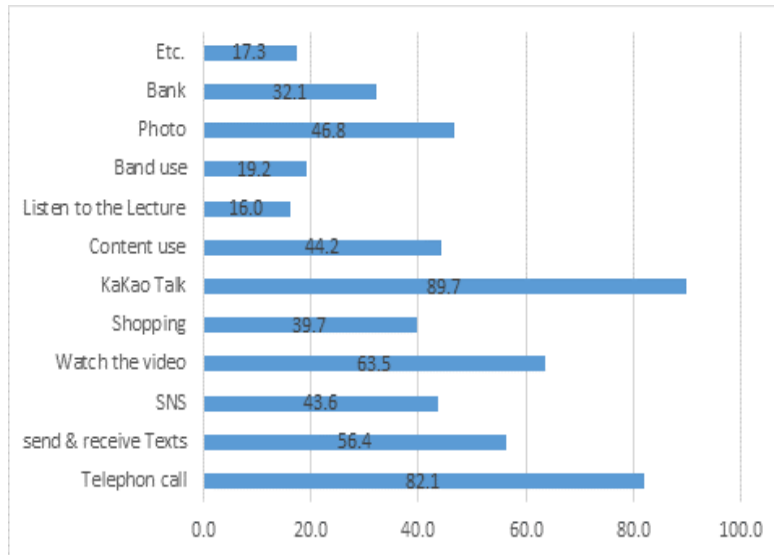


Figure 1. Frequently used mobile phone functions

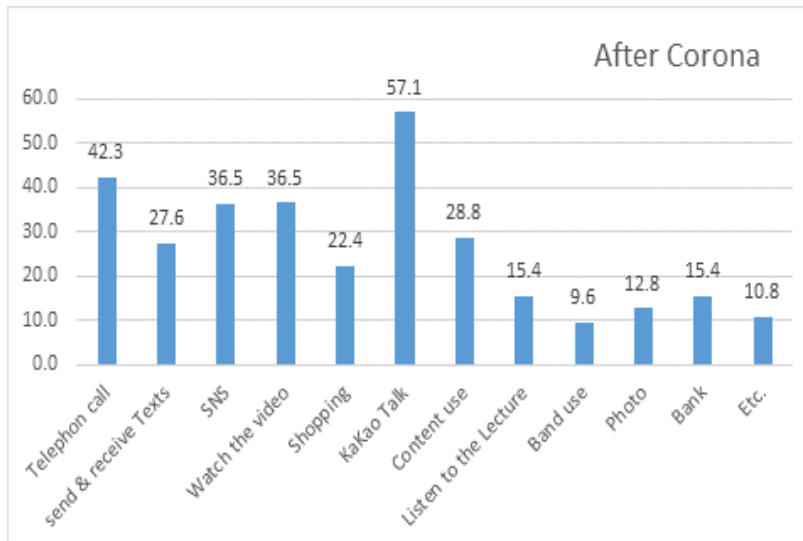


Figure 2. The most affected cell phone feature due to COVID-19.

After the COVID-19, the change in the use of the mobile phone function is shown in Figure 3. Due to the COVID-19, the most changes were KakaoTalk(57.1%), calls(42.3%), video and social media respectively(36.5%), content view(28.8%), shopping (22.4%), listening to lecture(15.4%), bank(15.4%), photo (12.8%), Etc.(10.8%), and bands(9.6%) were in this order.

4.6 Changes in life caused by COVID-19.

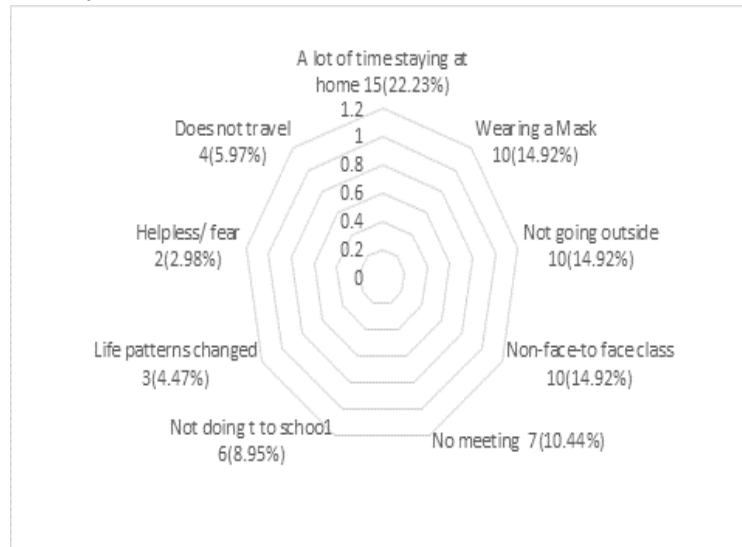


Figure 3. Changes in life caused by COVID-19

The biggest change in daily life due to COVID-19 is shown in Figure 3. the biggest change caused by COVID-19 in everyday life is the increased time spent staying at home (22.23%), going outside (14.92%), wearing a mask (14.92%), none face-to-face classes (14.92%), and meeting people None (10.44%) followed by no school (8.95%). In addition, there was a response that changed life patterns and complained of fear and helplessness.

4.7 External information acquisition.

In response to the question, "What media do you get from outside information and news?" Internet search through mobile phone (66%) was the highest, followed by Internet search through PC (16%), T.V(13%), radio (3%), and newspaper (2%) <Figure 4>.

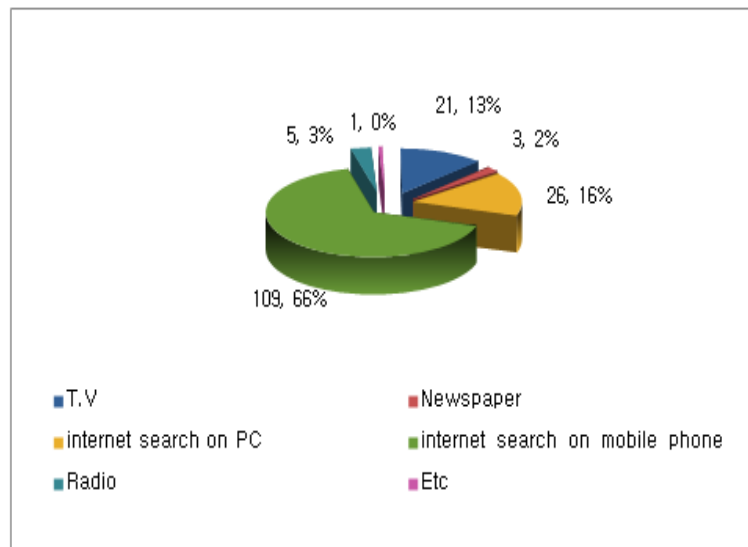


Figure 4. Media used to acquire external information and news.

As shown in the figure, modern people replied that external information and news were obtained through Internet search (69.8%) through mobile phones rather than TV or radio newspapers, which was higher than Internet search (16.6%) using computers.

5. CONCLUSION

At the present time, as the non-face-to-face contact culture due to COVID-19 is spreading throughout life, the individuals relying frequency on mobile phones is increasing regardless of age. In the functional use of the mobile phone, the frequency of use is not significant due to the enjoyment, but the frequency of use in the situation has a significant effect on the enjoyment. It can be seen that what came out solves the joy of respondents' lives with their mobile phones. Therefore, it can be said that the result is similar to the previous research [12, 13] that perceives the value of the mobile phone more highly through functional and situational use in the frequency of use of the mobile phone.

As a result, cell phone usage time per day was compared to before and after COVID-19. First the number of users who used less than an hour were 11.5% to 8.3% lower, and the number of users who used it for 3 to 4 hours also decreased, but it was 5 to 6 hours the number of user and users over 7 hours showed the highest increase of 12.9% and 13.4%. Second, due to COVID-19, changes in function use were in the order of KakaoTalk (57.1%), currency (42.3%), video and social media (36.5%), content (28.8%), and shopping (22.4%).

Third, as a result of analyzing the change in cell phone use time according to the age group, it was found to be statistically significant ($p < 0.001$). Fourth, there were more than 60% of respondents who answered because of the increased use of mobile phones, they could only go outside, because they had more time at home and more time alone. Fifth, the biggest change in daily life due to the occurrence of COVID-19 disappeared, and there were many responses such as wearing a mask, lack of face-to-face interpersonal relations, and inability to travel. Sixth, modern people responded to external information and news through Internet search (69.8%) through mobile phones rather than TV or radio newspapers, which had been higher than Internet search (16.6%) using computers.

Lastly, the use of KakaoTalk and texts, which were considered exclusively for young people, was also high in middle-aged and older people in their 40s and 60s. Therefore, in the previous study [11], there was a difference between the result of this study and the result that the frequency of use in their 40s and 60s was lower than that in their 20s due to the inability to use letters or manipulation techniques. This can be said to be the result of proving that it uses more additional functions than the phone function, which is the main function of the mobile phone, and is set as a general necessity product that is generalized and very closely related to everyday life, regardless of age.

Since this study targets only a part of a specific area called Jeju City, there are regional limitations and the limitation that the number of subjects does not cover all regions, so the following study needs to include subjects from various regions. As the function of mobile phones continues to develop, it becomes more and more dependent on daily necessities, and in the future, it will be reinforced with programs that can be psychologically stable and therapeutic, so that they can live well in the era of un-contact. For individuals, it is necessary to have leisure activities or self-development so that they can use their time well and enjoy themselves alone.

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