

EXPLORING THE JAPANESE GREY DIGITAL DIVIDE IN THE PANDEMIC ERA

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ABSTRACT

This paper discusses an empirical study undertaken of a sample of Japanese people across the digital divide, focusing on their perception of both connectivity and being informed as the pandemic unfolds. The aim is to identify common themes regarding how digital technology is used to support information and interaction during the pandemic. These are used to propose changes which might halt the grey digital divide becoming the grey digital chasm and improve support through fit-for-purpose digital technology to the most vulnerable in times of emergency. To achieve the aim, questionnaire surveys were conducted and 136 valid responses including ones from grey digital natives and outcasts were analysed. The results of the analysis demonstrate that the grey digital divide did not seem to exist in terms of the acquisition of information about COVID-19, and that both grey digital natives and outcasts preferred to receive such information via low- and no-tech media. However, Japanese grey digital outcasts may receive a low priority regarding COVID-19 vaccination which began in April 2021, due to Japanese local governments' adopting online systems to administer the vaccination programme.

INTRODUCTION

The world has changed since the pandemic. Online has become the accepted first channel of choice for communication and social interaction. Or, perhaps the world at large had no choice but to accept that online was the only viable method of ongoing social interaction and communication. Whichever is the reason, the fact remains that the gap has widened between those digitally included and those digitally excluded. The digital divide is rapidly becoming a digital chasm. The digital divide has come about through increasing global digital technological dependency. It is a social divide which sits upon a complex foundation of poverty, education, gender, age, status, location, and mental and physical faculty.

In times of global emergency, such as the COVID-19 pandemic, social divides are extremely harmful. It is morally unacceptable to ignore the risk of harm and to fail to provide essential support to the vulnerable. There has been a tendency by some governments and some service providers to be reactive rather than proactive in their approach. Whilst reactive action in a state of emergency is appropriate so also is proactive action which has a preventative function. As society's voices of concern rise, mirroring the increasing suffering of the most vulnerable, so those in a position to alleviate the suffering react. Proactive action is needed both to minimise the chance of short term suffering and to instigate long term strategies to remove barriers and promote wellbeing.

The relationship between the COVID-19 pandemic and digital technology is worthy of study because digital technology has become the de facto standard for communication of alerts, advice and regulation announcements. Digital outcasts are left out of this loop and as such could be disenfranchised, disheartened and damaged. This paper discusses an empirical study undertaken of a

sample of people across the digital divide, focusing on their perception of both connectivity and being informed as the pandemic unfolds. It is generally accepted that those of 65 years and over are most at risk in the pandemic; the older a person is the greater the risk (see, for example, Kang & Jung, 2020 and Signorelli & Odone, 2020). For this group, termed *the elderly*, the digital divide has likely increased the risk of deteriorating health and tragically increasing the likelihood of death. The paper drills down into one specific population – Japan, where digital technology has pervaded society, the ageing of the population is being accelerated at a pace exceeding the rest of the world, and the number of confirmed COVID-19 cases remains at the lowest level among developed countries although strong measures to contain the spread of the novel coronavirus such as a national lockdown have not been taken. The elderly are placed in the context of a wider demographic through the chosen sample.

The aim is to identify common themes regarding how digital technology is used to support information and interaction during the pandemic. These are used to propose changes which might halt the grey digital divide becoming the grey digital chasm and improve support through fit-for-purpose digital technology to the most vulnerable in times of emergency.

WORLD VIEW

It is necessary to place the empirical study into a global context so that perspective and relevance can be ascertained. Table 1 shows the global and Japanese situations between March 2020 and March 2021.

Table 1. Pandemic comparisons over time.

date	confirmed cases				deaths				vaccine doses			
	World	% inc	Japan	% inc	World	% inc	Japan	% inc	World	% inc	Japan	% inc
07/03/2020	107,444		411		3,510		6					
07/08/2020	18,981,861	17,566.7	43,815	10,560.6	705,337	19,995.1	1,033	17,116.7				
07/11/2020	49,919,672	163.0	105,914	141.7	1,243,539	76.3	1,809	75.1				
07/03/2021	115,653,459	131.7	437,892	313.4	2,571,823	106.8	8,178	352.1	249,160,837		28,530	
31/03/2021	127,877,462	10.6	472,112	7.8	2,796,561	8.7	9,113	11.4	520,540,106	108.9	46,469	62.9
% against population	1.628		0.374		0.036		0.007		6.627		0.037	
	7,854,570,325		126,195,091		7,854,570,325		126,195,091		7,854,570,325		126,195,091	

Source: WHO COVID-19 dashboard at <https://covid19.who.int/>

The % Inc column shows the percentage increase from the previous date to the date in question. For example, between March 2020 and August 2020 there was a global 17,566.7% increase of confirmed cases and a Japanese 10,560.6% increase of confirmed cases. During March 2021, the percentage increase globally had fallen to 10.6% and in Japan, had fallen to 7.8%. Nearly 2.8 million people have died of COVID-19 of which nearly 10 thousand reside in Japan. Between 7 March 2021 and 31 March 2021 global vaccine doses increased by 108.9% to over 520 million people being vaccinated which represents 6.627% of the global population. In Japan for the same period, vaccine doses administered increased by 62.9% to over 46 thousand people which represents 0.037% of the country's population.

The large difference in death rates related to COVID-19 by age has been reported widely (see, for example, Signorelli & Odone, 2020, and Kang & Jung, 2020). The elderly are more likely to die of COVID-19 than the young. Omori et al (2020) have found that across Italy, Spain, and Japan, the age distributions of COVID-19 mortality show only small variation even though the number of deaths per

country shows large variation. This suggests that a study in one of these countries will have relevance to the other two and maybe beyond.

On 25 March 2020 it was reported by the BBC that one quarter of the world's population was living under some form of lockdown. Armitage & Nellums (2020) explain that self-isolation will disproportionately affect the elderly because of increased risk of cardiovascular, autoimmune, neurocognitive and mental health problems. It is estimated that 9% of the global population of 7.8 billion people are over 65 years of age³¹. Current access to the Internet stands at 62% of the global population³² and of this 7% (0.3385 billion) are over 65 years of age³³. This means that only 48% of the global population over the age of 65 years of age can be classified as grey digital natives. Therefore, the grey digital divide comprises 363.5 million digital outcasts. They are at particular risk during the COVID-19 pandemic because they become more isolated through their lack of communicative support by the authorities who tend to inform only through digital technology conduits. The global distribution of these outcasts will likely mirror disparities between developed and developing regions, urban and rural, rich and poor and literate and illiterate people. By way of illustration, out of the total global digital outcast population 27% reside in Africa, 31% in Southern Asia and 19% in Eastern Asia³⁴.

The global Internet economy has been defined as comprising three components: access provision – how we connect; service infrastructure – how we build and sustain the Internet; and Internet applications – how we communicate, share and innovate (Internet Society, 2020). During the pandemic, the performance of these components has been mixed. For example, video conferencing through portals such as Zoom, has provided excellent links for digital natives although “zoom burnout” has become a new phenomenon. However, broadband in rural areas has significantly reduced the ability for reaching out to the elderly in those areas.

DEFINITIONS

In this paper the following definitions are used (Rogerson, 2021).

- Demographic Profile: includes age, gender, ethnicity, faith, literacy and economic status.
- Digital Divide: the disparity in access, usage and benefit of any digital technology. On one side are those who are digitally included and on the other are those who are digitally excluded.
- Digital Native: the digitally literate, regardless of demographic profile, who use, and are somewhat dependent upon, digital technology.
- Digital Outcast: those, regardless of demographic profile, who are unable, for whatever reason, to access the benefits offered through the use of digital technologies.
- Elderly: anyone of 65 years and over. The elderly are often referred to as grey to differentiate them as population group; hence grey digital divide is now a commonly used term.

³¹ statista at <https://www.statista.com/statistics/265759/world-population-by-age-and-region/>

³² World Internet Usage and Population Statistics 2020 Year-Q2 Estimates at 20 June 2020 at <https://www.Internetworldstats.com/stats.htm>

³³ statista at <https://www.statista.com/statistics/272365/age-distribution-of-Internet-users-worldwide/>

³⁴ <https://thenextweb.com/growth-quarters/2020/01/30/digital-trends-2020-every-single-stat-you-need-to-know-about-the-internet/>

- Rogerson (ibid) explains that in any investigation of digital technology usage by the elderly during the pandemic, it is appropriate to use new terms Grey Digital Native and Grey Digital Outcast to describe the elderly positioned either side of the grey digital divide.

GREY DIGITAL DIVIDE TYPOLOGY

It is necessary to provide a more detailed description of the terms Grey Digital Native and Grey Digital Outcast. This will then enable the collected empirical data to be analysed using these descriptions. These detailed descriptions are derived by extending the user typology created by Birkland (2019) since this typology only covered the Native side of the Grey Digital Divide.

Birkland (2019) defines five types of Grey Digital Native:

- Enthusiast – is very positive about information and communication technology (ICT) and views it as a fun toy
- Practicalist – views ICT as a utility which enable specific tasks to be undertaken
- Socializer – uses ICT to extend interactions across intergenerational networks and communities
- Traditionalist – views ICT of the past as something to cherish rather than modern versions
- Guardian – views all ICT with caution and wants to act as a guardian against the downside of ICT usage.

To complete the topology five types of Grey Digital Outcast are suggested (Rogerson, 2020):

- Impoverished – having low economic status and/or limited ICT resources
- Isolated – geographically or socially remote from ICT users
- Illiterate – having a low level of general or technological knowledge
- Wary – being apprehensive of technology in general and ICT in particular
- Uninterested – seeing no purpose in accessing ICT rather than other channels and other activities

Birkland's user typology thus evolves into a Grey Digital Divide Typology as shown in Table 2 (Rogerson, 2020). It is this typological tool which can be used to analyse the empirical data. Circumstances and experiences could cause the elderly to move between types and across the divide. Indeed, Van Dijk (2005) explains that the elderly move between native and outcast depending upon mental, physical, financial and motivational circumstance. Given the typology it seems possible that an individual could reside in more than one type on one side of the divide.

Table 2. The grey digital divide typology.

	Grey Digital Natives (Birkland 2019)	Grey Digital Outcasts (Rogerson 2020)
1	Enthusiast	Impoverished
2	Practicalist	Isolated
3	Socializer	Illiterate
4	Traditionalist	Wary
5	Guardian	Uninterested

Level of digital technology usage is considered an important second dimension in the analysis. The use or non-use of digital technology is differentiated by a simple three-part classification: *no-tech* – print media, written letters and face to face dialogue; *low-tech* – television, radio and telephone; and *high-tech* – smartphone, social media and Internet (Rogerson, 2021).

JAPAN OVERVIEW

According to *worldometer* the population of Japan is 126.48 million with 92% living in urban areas and 8% living in rural areas. The life expectancy is 85.03 years. Japan has the world's largest percentage of elderly adults totalling 35.58 million (source: www.prb.org/countries-with-the-oldest-populations). As seen in Table 1, as at 31 March 2021, there have been 472,112 confirmed cases of COVID-19 resulting in 9,113 deaths.

Figure 1 shows cases and deaths across the age ranges. This distribution of coronavirus disease (COVID-19) cases in Japan as of March 3, 2021, shows that the highest number of patients were aged 20 to 29 years old, with a total of around 94.5 thousand cases. The highest number of deaths is among the patients aged 80 years and older at about 4.7 thousand cases. The Japanese health ministry announced on March 5 that there was a total of around 436.7 thousand confirmed cases of COVID-19 in Japan. This data shows that those aged over 60 years account for 24% (105,940) of reported cases yet they account for 96% (6,508) of reported COVID-19 related deaths. Those over 80 years of age accounted for 64.8% of deaths. This clearly demonstrates the primary need to protect the elderly through preventative medical care, appropriate communication and social support.

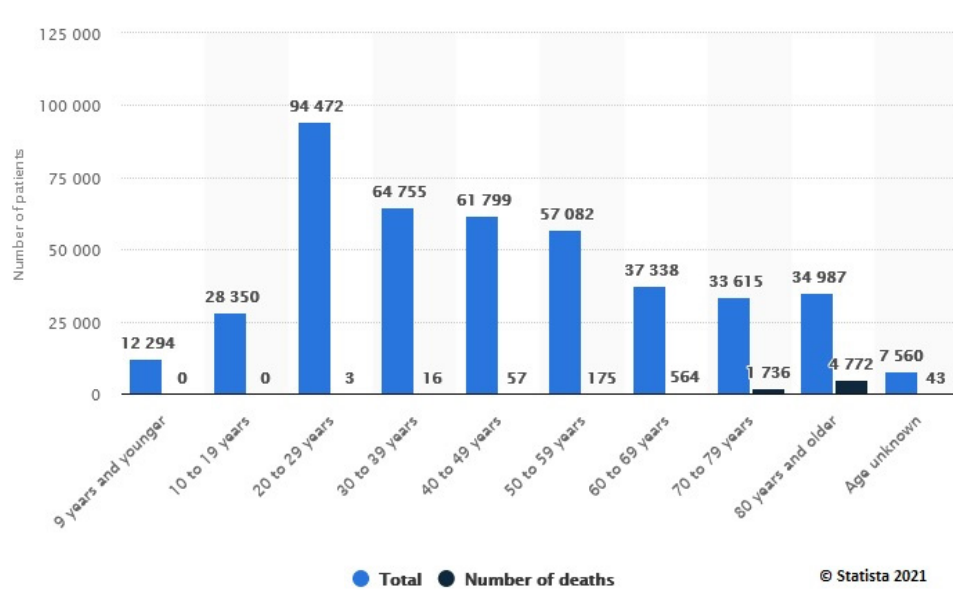
Statista (2020) reports that Japan is fourth highest internet user in East Asia with 117 million users but the distribution of this population was affected by age, region, and income level. The Internet in Japan usually comes unbundled, meaning that customers in general have contracts both with a line provider and an internet service provider (ISP). Okabe (2020a) suggests that there are many elderly Japanese who are unfamiliar with using digital technologies which lack the traditional and familiar means of identification such as the personal stamps (*inkan* 印鑑) and common seals (*kōin* 公印). Furthermore, Okabe (2020b) suggests many elderly and impaired people of becoming excluded from retail which is increasingly moving online as these people cannot use the digital equipment and are unfamiliar with online shopping techniques. It seems there needs to be improved digital social scaffolding for the elderly. The White Paper Information and Communication in Japan (MIC, 2020) reported that Internet usage rate is 89.8% in 2019 for the whole population (79.8% in 2018), 90.5% for 60-69 year olds (76.6% in 2018), 74.2% for 70-79 year olds (51.0% in 2018), and 57.5% for those 80 years old and over (21.5% in 2018). This suggests that there remains a grey digital divide albeit diminished and this becomes more significant in the over 80 year olds where around 65% of COVID-related deaths occur. This implies that there exists a reasonable population of grey digital natives and grey digital outcasts from which to sample.

SURVEY METHOD

To investigate elderly Japanese people's attitudes and behaviour towards COVID-19 in relation to digital technologies in particular, questionnaire surveys were conducted online – using Google Forms – as well as offline – using a pencil-and-paper questionnaire. The survey was conducted in Tokyo and four local cities in Japan (Bizen, Chiryu, Matsuyama and Takaoka) from August to December 2020,

6. Open Track

Figure 1. Patient profile of COVID-19 cases in Japan as of March 2021, by age group.



Source: <https://www.statista.com/statistics/1105162/japan-patients-detail-novel-coronavirus-covid-19-cases-by-age-and-gender/>

with the support of those experts who were engaged in welfare service for the elderly in Japan or local community support. The original English questionnaire, which was qualitative-based using seven open-ended questions, was developed by one of the authors (Rogerson), and was translated into Japanese by the rest. Based on the suggestion given by one of the experts, response alternatives were set in three of the seven open-ended questions to ease strain on elderly respondents when responding to the questionnaire. Out of 141 responses, 136 were deemed to be valid of which 32 were provided online. The attributes of respondents are shown in Table 3. There are 67 digital outcasts of which 59 are grey digital outcasts and 69 digital natives of which 34 are grey digital natives. That more than 60% of respondents above 65 were grey digital outcasts demonstrates the collected data was suitable for our research purpose. The data was analysed statistically using chi-squared tests and the User Local text mining tool³⁵.

Table 3. Attributes of respondents.

Age group	Internet usage		Total
	Internet users	Non-Internet users	
Above 65	34	59	93
Between 60 and 65	22	3	25
Below 60	13	5	18
Total	69	67	136

³⁵ <https://textmining.userlocal.jp/>

SURVEY FINDINGS

Perceived source of information about COVID-19 for the public

The survey results indicate that most of respondents considered the public’s main sources of information about COVID-19 were TV news and newspapers as shown in Figure 2. It is statistically confirmed that this tendency did not vary between users and non-users of the Internet, as well as across age groups. On the other hand, as Table 4 shows, more than a half of respondents above 65 felt tabloid TV shows (55 out of 93) and family members or friends (49 out of 93) were information sources about the disease, whereas significantly a lower percentage (less than 30%) of respondents at age 65 years or younger considered they (12 and 11 out of 43, respectively) were important information sources for the public. While online news sites are considered a good information source for the public by more than a half of respondents at age 65 years or younger, less than 20% of respondents above 65 felt this, showing a significant difference at 1% level between age groups. Official government announcements made online were not recognised a helpful information source for the public by most respondents regardless of age group or Internet usage ($p=.3761$).

Figure 2. Perceived source of information about COVID-19 for the public (N=136; multiple answers allowed).

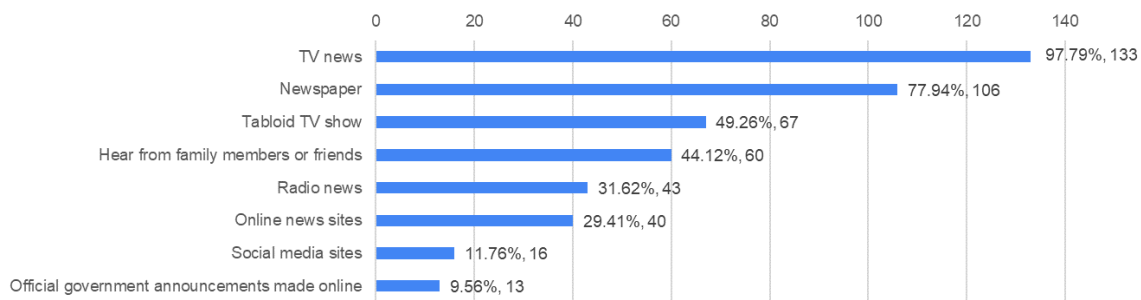


Table 4. Perceived source of information about COVID-19 for the public by age groups (multiple answers allowed).

How is information about COVID-19 made available to the public?	Above 65 (93)		At age 65 years or younger (43)		p-value
	Number	%	Number	%	
TV news	91	97.85%	42	97.67%	.9923
Newspaper	79	84.95%	27	62.79%	.1736
Tabloid TV show	55	59.14%	12	27.91%	.0158 *
Hear from family members or friends	49	52.69%	11	25.58%	.0269 *
Radio news	39	41.94%	4	9.30%	.0016 **
Online news sites	18	19.35%	22	51.16%	.0015 **
Social media sites	6	6.45%	10	23.26%	.0079 **
Official government announcements made online	11	11.83%	2	4.65%	.2081

As shown in Table 5, TV news, newspapers, tabloid TV shows and family members or friends were perceived to be the public's source of information about COVID-19 by at least half of respondents above 65, regardless of whether they are Internet users or not. There was a significant difference in respondents' recognition concerning online news sites as an information source about the disease for the public between Internet users and non-users at 1% level. A large majority of respondents above 65, regardless of their Internet usage, did not feel official government announcements made online to be a COVID-19 information source.

Table 5. Source of information about COVID-19 for the public perceived by respondents above 65 (multiple answers allowed)

How is information about COVID-19 made available to the public?	Internet users (34)		Non-Internet users (59)		Total	p-value
	Number	%	Number	%		
TV news	33	97.06%	58	98.31%	91	.9533
Newspaper	28	82.35%	51	86.44%	79	.8368
Tabloid TV show	17	50.00%	38	64.41%	55	.3843
Hear from family members or friends	19	55.88%	30	50.85%	49	.7473
Radio news	15	44.12%	24	40.68%	39	.8051
Online news sites	14	41.18%	4	6.78%	18	.0003 *
Social media sites	5	14.71%	1	1.69%	6	.0174 *
Official government announcements made online	3	8.82%	8	13.56%	11	.5225

Respondents' preferred source of information about COVID-19

As with respondents' perception of information source for the public, TV news and newspapers were the sources of information about COVID-19 most preferred by respondents (Figure 3). However, there were statistically significant differences in the preference tendencies between age groups. Respondents above 65 tended to prefer to access information about COVID-19 via TV news, newspapers, Tabloid TV shows, family members or friends and radio news more than respondents at age 65 years or younger at 1% level, as shown in Table 6. On the other hand, online news sites were preferred information sources for respondents at age 65 years or younger more than for respondents above 65 at 1% level. However, a large majority of respondents did not prefer to gain information about the disease from official government announcements made online regardless of their age.

Figure 3. Respondents' preferred source of information about COVID-19 (N=136; multiple answers allowed)

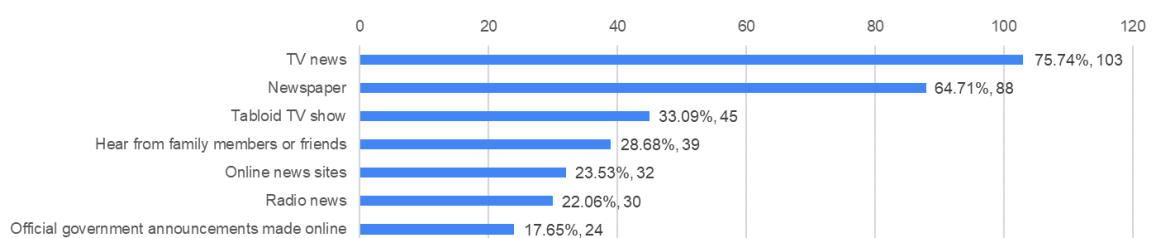


Table 6. Respondents' preferred source of information about COVID-19 by age groups (multiple answers allowed)

What is your preferred way of receiving information about COVID-19?	Above 65 (93)		At age 65 years or younger (43)		p-value
	Number	%	Number	%	
TV news	83	89.25%	20	46.51%	.0077 **
Newspaper	75	80.65%	13	30.23%	.0007 **
Tabloid TV show	40	43.01%	5	11.63%	.0031 **
Hear from family members or friends	38	40.86%	1	2.33%	.0001 **
Online news sites	15	16.13%	17	39.53%	.0089 **
Radio news	29	31.18%	1	2.33%	.0009 **
Official government announcements made online	13	13.98%	11	25.58%	.1342

As shown in Table 7, a statistically significant difference in above-65-respondents' preference to online news sites as sources of information about COVID-19 was found at 1% level. However, Internet usage by respondents above 65 tended not to affect significantly their preferred ways of receiving information about the disease.

The outcomes of text mining of responses to the open-ended question about reasons for respondents' preferred ways of receiving information about COVID-9 suggest that they eagerly desired to get correct, unbiased and trustworthy information, whenever they want and in a convenient way (Figure 4). 53 respondents, of which 6 were non-Internet users, responded to this question, and many of them emphasised the importance of getting correct and unbiased information from trustworthy sources.

Typical comments from respondents were, "I want to get as correct information as possible", "I want to get information from various sources and judge autonomously" and "I'd like to get information from trustworthy people", despite the differences in their preferred ways of getting information about the disease. The ease and timeliness of information acquisition were also stressed by many. A respondent using the Internet commented, "Online news sites provide us with news most promptly. We can access to them anytime and anywhere. This is convenient", whereas another who was a non-Internet user mentioned, "[TV news is] the easiest way to get information". These attitudes may be reflected in the survey results that respondents' main sources of information about the disease were TV news and newspapers and even grey digital natives tended not to search actively such information online accessing, for example, dedicated websites for COVID-9 such as the Novel Coronavirus Website of the Ministry of Health, Labour and Welfare³⁶. However, given the fully commercialised TV media in Japan and its low rank of freedom of the press (67th according to the 2021 world freedom press index issued by the Reporters without Borders³⁷), this may show that Japanese grey digital outcasts, as well as natives, receive distorted information about the pandemic: their sense of fear of COVID-19 may be unnecessarily promoted, and what they can know about the disease may be controlled by the government.

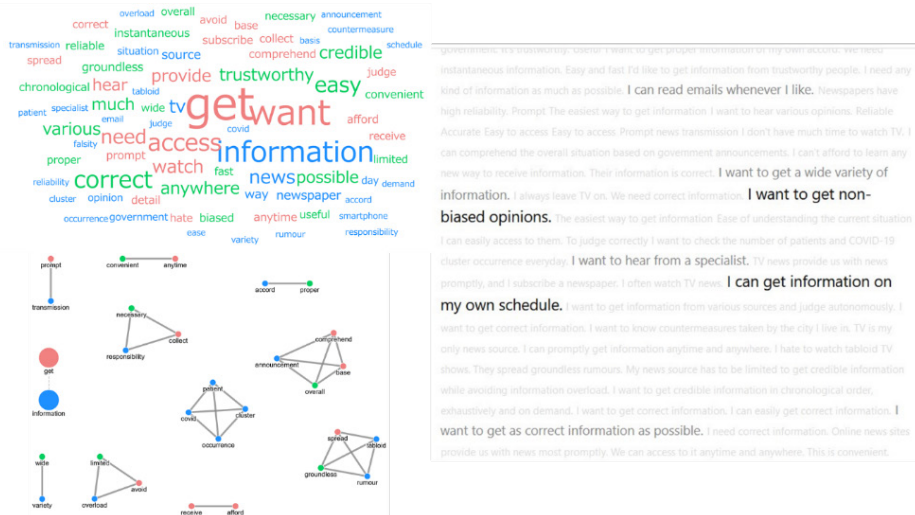
³⁶ https://www.mhlw.go.jp/stf/seisakunitsuite/bunya/0000164708_00001.html

³⁷ <https://rsf.org/en/japan>

Table 7. Preferred source of information about COVID-19 for respondents above 65 (multiple answers allowed).

What is your preferred way of receiving information about COVID-19?	Internet users (34)		Non-Internet users (59)		Total	p-value
	Number	%	Number	%		
TV news	26	76.47%	57	96.61%	83	.3221
Newspaper	25	73.53%	50	84.75%	75	.5619
Tabloid TV show	11	32.35%	29	49.15%	40	.2342
Hear from family members or friends	9	26.47%	29	49.15%	38	.0994
Online news sites	13	38.24%	2	3.39%	15	.0001 **
Radio news	10	29.41%	19	32.20%	29	.8164
Official government announcements made online	6	17.65%	7	11.86%	13	.4726

Figure 4. Text mining outcomes (Reason for preferred ways of receiving information about COVID-19).



SYNTHESIS

To reveal the characteristics of attitudes and behaviour of Japanese grey digital natives and outcasts based on the survey results, we focus only on respondents above 65 and use the grey digital divide typology and the level of digital technology usage. Hereafter, grey digital natives mean respondents above 65 who used the Internet, and grey digital outcasts mean those who did not use the Internet. Based on their responses to the question on the purpose of Internet usage, 33 grey digital natives (one of the respondents did not answer this question) can be classified as follows: 13 enthusiasts, 6 practicalists, 13 socializers and 1 traditionalist. However, as Table 8 shows, a large majority of high-tech users – even enthusiasts – preferred to get information about COVID-19 from low-tech – TV news – and no-tech media – newspapers.

It is hard to imagine that grey digital outcasts fell into the classification of impoverished or isolated, given their residential areas and the fact that paper-based survey data were collected by the experts mentioned in Section 6 – all of them were ICT users. It is possible that grey digital outcasts were illiterate, wary or uninterested. As shown in Table 9, just 7 out of 59 grey digital outcasts preferred to acquire information about COVID-19 online demonstrating a large majority of them were would-be low-tech users, whereas there was no one who preferred to receive information only from no-tech media.

Table 8. Preferred source of information about COVID-19 for grey digital natives (multiple answers allowed).

What is your preferred way of receiving information about COVID-19?	Types of grey digital natives							
	Enthusiast (13)		Practicalist (6)		Socializer (13)		Traditionalist (1)	
	Number	%	Number	%	Number	%	Number	%
TV news	11	84.62%	4	66.67%	10	76.92%	0	0.00%
Newspaper	11	84.62%	3	50.00%	10	76.92%	0	0.00%
Online news sites	6	46.15%	3	50.00%	4	30.77%	0	0.00%
Tabloid TV show	4	30.77%	2	33.33%	5	38.46%	0	0.00%
Radio news	3	23.08%	2	33.33%	5	38.46%	0	0.00%
Hear from family members or friends	4	30.77%	1	16.67%	4	30.77%	0	0.00%
Official government announcements made online	3	23.08%	2	33.33%	1	7.69%	0	0.00%
Social media sites	1	7.69%	0	0.00%	1	7.69%	1	100.00%
Magazine	0	0.00%	1	16.67%	2	15.38%	0	0.00%
City office's website	1	7.69%	0	0.00%	0	0.00%	0	0.00%
Blogs and websites personally run	0	0.00%	0	0.00%	1	7.69%	0	0.00%
Local city news	1	7.69%	0	0.00%	0	0.00%	0	0.00%
Relevant books	1	7.69%	0	0.00%	0	0.00%	0	0.00%

Table 9. Preferred source of information about COVID-19 for grey digital outcasts (multiple answers allowed)

What is your preferred way of receiving information about COVID-19?	Would-be low-tech user (52)		Would-be high-tech user (7)	
	Number	%	Number	%
TV news	51	98.08%	6	85.71%
Newspaper	43	82.69%	7	100.00%
Hear from family members or friends	23	44.23%	6	85.71%
Tabloid TV show	23	44.23%	6	85.71%
Radio news	15	28.85%	4	57.14%
Official government announcements made online	0	0.00%	7	100.00%
Magazine	3	5.77%	3	42.86%
Online news sites	0	0.00%	2	28.57%
Information from municipal office	1	1.92%	0	0.00%
Blogs and websites personally run	0	0.00%	1	14.29%

CONCLUSION

The results of our questionnaire surveys suggest that the phenomenon of grey digital divide does exist in Japan in the sense that there was a significant number of Internet users among respondents above 65 (34 out of 93) whereas more than 60% of them (59) were non-Internet users. However, the grey digital divide did not seem to exist in terms of the acquisition of information about COVID-19 at least as of December 2020 when the surveys were completed.

More than 60% of grey digital natives (21 out of 33) used the Internet for communicating with others by email (18), instant messenger (15) and/or toll-free phone call (9), and nearly a half of them (16) for online search. Though they could potentially use digital technology to access various information about the disease through searching and interacting online, Japanese grey digital natives showed their reluctance to accessing such information, preferring to depend on low- and no-tech media.

On the other hand, we can make a good guess that grey digital outcasts communicate with others using phone calls, written letters and/or face to face dialogue. In fact, nearly a half of them (29 out of 59) preferred to receive information about COVID-19 through hearing from family members or friends, whereas less than 30% of digital natives (9 out of 34) preferred this route. Nearly 90% of grey digital outcasts (52 out of 59) were would-be low-tech users, meaning that they did not have an intention to use the Internet to get information about the disease even during the pandemic era. In Japan, however, vaccination against COVID-19 has given to a greying generation since April 2021 at a really sluggish pace, and many of local governments that are in charge of the vaccination adopt online systems which allow people to make reservations for the vaccination via smartphone or PC. This may result in making the latent grey digital divide a reality, leading to grey digital outcasts disadvantaged and even penalised within the vaccination programme.

ACKNOWLEDGEMENTS

The authors appreciate the cooperation for conducting the surveys provided by Professor Shizuka Suzuki, Ms. Qi Zhang and Ms. Haruka Suzuki of Ehime University, Mr. Masashi Kanegae of the Japan Support Center for Activity and Research for Older Persons, Mr. Hiroyasu Nakanishi of the Bizen Katakami Mutual Support Committee and Mr. Kazuhiko Takeichi of the Japan Senior Citizens' Council.

KEYWORDS: digital divide, digital outcast, COVID-19, Japanese elderly.

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