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## Stay-at-home: impact of pandemic covid-19 on the use of indoor space in Malaysian households

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# Stay-at-home: impact of pandemic covid-19 on the use of indoor space in Malaysian households

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**Abstract.** The prolongation of the Pandemic COVID-19 has undermined the healthcare system and negatively impacted the economy and social development on a global and regional scale. At the human settlement level, responding to the pandemic situation has altered the broad spectrum of our daily routine down to the family and individual levels. Prior to the lockdown popularly known as the Movement Control Order (MCO), which the government introduced, the public was urged to limit outdoor movements and stay at home hence, encouraging the adoption of Work From Home (WFH) for employees and Home-based Teaching and Learning (PdPR) for the academic community and school students. Other than technological readiness for online working and teaching, the new normal also prompted new challenges for households in utilizing indoor spaces at home, especially for quarantine as well as for WFH and PdPR activities. In this light, a series of household surveys using questionnaires to determine the preference and usage of indoor space among households have been conducted in 39 locations/settlements across peninsular Malaysia. A total of 504 respondents participated and fieldwork and interview processes. Findings of the study indicated a majority of respondents have to designate indoor spaces/rooms for home quarantine (58%), and the three indoor spaces, in particular, have been monitored regularly by respondents during the pandemic, namely living areas (39%), kitchen (25%) and bedroom (21%). During MCO, most of them spent 1 to 4 hours per day for PdPR (43%), and 47% of respondents have a designated learning space at home for PdPR. In summary, pandemic COVID-19 has raised awareness among households regarding the selection and usage of indoor space to conduct various activities while they have to stay at home.

**Keywords:** covid-19, pandemic, quarantine

## 1. Introduction

The unprecedented event of the COVID-19 pandemic places the world's health, economy, and education at stake. Population in Malaysia is greatly affected by this pandemic, and the vulnerable communities are expected to suffer the impacts. The first COVID-19 case was detected in Wuhan, China, in December 2019, and since then, it was rapidly spread globally [1]. As of November 2021, there were over 250



million cases worldwide, with 5.06 million deaths. While in Malaysia, the first case was recorded in February 2020 in Selangor, and there were more than 2.5 million cases reported, with nearly 30,000 deaths in November 2021 [2]. COVID-19 is an infectious disease caused by SARS-CoV-2. The mode of transmission is from human to human, with the direct transmission from nasal or mouth droplets that are spread when the infected person coughs or sneezes. The WHO emphasizes that the keys to COVID-19 response and controlling transmissions are through identifying, isolating, and treating cases and tracing and quarantining contacts [2, 3]. The infected patients should be isolated and receive appropriate care in order to stop the spreading of the virus. Various platforms for surveillance and public health measures at global, regional, and national levels have been intensified and adapted by the WHO and MOH all over the world. The initiatives were tailored to specific contexts and have supported national authorities in combating the virus via tracing and surveillance [3].

*Perintah Kawalan Pergerakan (PKP)*, commonly referred to as the Movement Control Order (MCO), is a series of national quarantine and cordon sanitaire measures implemented by the Government of Malaysia in response to the COVID-19 pandemic starting on 18 March 2020 [4]. The MCO was also commonly referred to internationally and locally as "lockdown" [2]. MCO measures encompassed restrictions on movement, assembly, and international travel and mandated the closure of business, industry, government, and educational institutions to curb the spread of COVID-19. The MCO was extended and relaxed to a few different phases in 2020 and 2021, including the Conditional Movement Control Order (CMCO) and Recovery Movement Control Order (RMCO) [2] [4]. Several phases have been enacted nationwide, but other measures have been localized to individual states and federal territories or smaller settlement areas. The movement control component of MCO was included in the National Recovery Plan (NRP,) launched in June 2021. The vaccination program started in February 2021, with the initially targeted groups being healthcare workers and frontliners, then followed by the elderly and adults with comorbidities [4].

In curbing the spreading of COVID-19, the WHO recommends rapid identification of people infected with SARS-CoV-2 and isolation in designated facilities or quarantine based on the disease severity, and almost all cases experience symptoms within 14 days [2] [9]. However, there are varying symptoms among the cases, which is why the policy for quarantine is used as a risk management approach. The establishment of quarantine stations is a requirement under section 14 of the Prevention and Control of Infectious Diseases Act 1988 (Act 342), which is used to carry out segregation or observation on any infected person or someone who is believed to have been infected by an authorized officer. An infected person can be detained at a quarantine station until the person is believed not to pose any danger to the public [2]. The government has prepared quarantine sets for this purpose, such as hospital wards and quarantine centers [5]. As for the general population, which is still spared from COVID-19 infection but remain at high risk, especially among vulnerable groups (particularly the elderly and those with chronic diseases), the government has imposed the stay-at-home order for confronting the pandemic [4].

The scope of stay-at-home has also been expanded to include home quarantine which is classified as quarantine in non-health resolutions and intended for anyone who believes they have been exposed to COVID-19 and is advised by the hospital to be in their own home; to be quarantined as a preventive measure for a community spread [6]. Besides quarantine at home, the general public, workers, and students also utilized their homes for continuing office work (work from home, WFH) as well as for school and tertiary education (PdPR) activities [4] [10]. However, there are some concerns regarding household overcrowding, whether it is measured as a living, bedroom, or floor area, which can lead to both physical and mental health. However, household overcrowding also depends on age and the relationship between households. The perception of overcrowding may be considered if two adults do not share a bed, or the perception of crowded may not be considered crowded if households gather in certain spaces to avoid the cool part of the home spaces at a cost-related time. The effects of crowding can be widely defined as hazards associated with insufficient space to accommodate life activities, sleep, eating, and so forth [6]. It is considered a factor that puts pressure on health and wellbeing across different aspects of low - middle, and high-income countries.

Several studies have reported that there is a direct link between crowdedness and health, mental health, and education [2] [7]. The perception of overcrowding has to do with indoor or household movement. According to [7], when relationships between households through space arrangements are integrated through complex indoor activities, space arrangements will appear in the residents' view. The space arrangement allows households to control relationships, movements, and activities such as relationships of host and guests, male household members and female household members, and children and parents. In controlling relationships between household members through space hierarchies, the highest social integration is the most integrated space in the house.

## 2. Methodology

This section explains the research methodology employed, which is cross-sectional descriptive and analyzed quantitatively through the primary data collected during the interview processes. The research areas are grouped into four categories based on the information gained from the Department of Statistics Malaysia (DOSM) and the Ministry of Education (MOE). The sampling frame was based on the DOSM National Population and Housing Census 2010 and matched with the MOE service circular. Data from a minimum of 384 households (HH) are collected out of 229,411 HH in the peri-urban and rural settlement areas (95% confidence level and 5% confidence interval), with 39 selected locations where the two-stage stratified sampling method is utilized; enumeration block (EB) and living quarters (LQ) (Figure 1). However, by taking into account the 30% non-response rate, the minimum sample size was 500 samples.

In the data collection phase, as this study used structured face-to-face interviews with the participants in the peri-urban and rural areas, several bureaucratic steps need to be observed. The researchers were assisted by research assistants and enumerators throughout the research period. During the interview sessions, everyone who joined the field trips was tested for COVID-19 status and wore personal protective equipment to avoid virus contractions among the team members and respondents. All kinds of rights and privacy of the participants were also observed. Data obtained from face-to-face interviews were transferred to Microsoft Excel by the enumerators, followed by a frequency analysis process using Statistical Package for Social Sciences (SPSS) software.

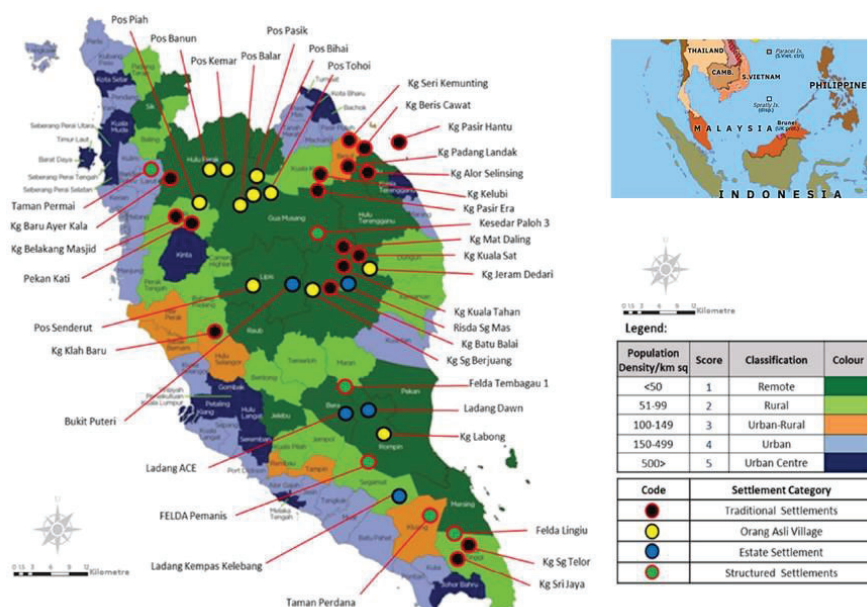


Figure 1. Research areas in peninsular Malaysia [8]

### 3. Analysis and Discussion of Results

This section captures the socio-demographic profile of the HHs that includes the distribution across the locations, race, and marital status. The discussions have further delineated the choice and use of indoor space besides the choice of quarantine location if they or family members are infected as well as the children's education and neighborhood environment.

#### 3.1. Socio-demographic profile of the households

This study involves a sample of 504 HHs from 39 peri-urban and rural areas in Peninsular Malaysia. The division of the HH and the locations are 234 HH from 17 traditional settlements, 131 HH from 6 structured settlements, 83 HH from 5 locations of estate quarters, and 56 HH from 13 Orang Asli settlements (Table 1).

**Table 1.** Distribution of samples based on locality

General information	Structured settlements		Traditional settlements		Estate quarters		Orang Asli settlements		Total	
	Num.	%	Num.	%	Num.	%	Num.	%	Num.	%
1. Location	6	15.4	17	43.6	5	12.8	11	28.2	39	100.0
2. Num. of Household	131	26.0	234	46.4	83	16.5	195	12.8	540	100.0

A total of 504 HH are interviewed in locations spread across five states in Peninsular Malaysia; Johor, Kelantan, Pahang, Perak, and Terengganu. The majority of the HHs interviewed were from the state of Pahang, with 144 HHs, followed by 108 HHs in Johor and 102 in Perak. Majority of respondents were from traditional settlements 234 (46.4%), while 131 (26.0%) from structured residence, 83 (16.5%) from estate quarters and 56 (11.1%) from Orang Asli settlements. In Terengganu, all the respondents were from traditional settlements. At the same time, the visited estate quarters were only in Johor and Pahang (Table 2). About 66.9% of the HHs interviewed are Malay, with 209 of them living in traditional settlements, 108 in structured residence, and 20 in estate quarters. The majority of the HHs in estate quarters are foreign workers working in the plantations (62.7%). Orang Asli makes up 11.7% of the HHs sampling, and most of them live in Orang Asli settlements. Chinese interviewees are only 5% of total HHs, while India interviewees are 6.2%.

The majority (62.3%) of HHs were at the age of 30-59 years old, which is within the working age with median overall age of 49 years old. Structured residence shows the highest median age of 58 years old, and the traditional settlements at the second-highest with 53 years old. The lowest median age is from estate quarters at 37 years old. Most respondents from estate quarters were workers who are involved in heavy labor, which showed the lowest HH median age, the minimum age for estate quarters is 21 and the maximum at 61. The majority of the HHs have the number of children range from three to six at 244 (48.4%), with 115 were from the traditional settlements, followed by 79 families from the structured residence area. Total of 116 (23.0%) have less than three children, and most of them live in the estate quarters at 46.3%. On the other hand, 15.5% HHs do not have children, and only 0.5% of HHs have more than 12 children. On average, most Orang Asli settlements have 3 to 6 children (44.6%), and a portion of 14.3% do not have children. The highest number of children is 15 in the structured residence area, and the average number of children from the total respondents is 4 (Table 2).

**Table 2.** Socio-demographic of household (n=504)

Information	Structured settlements		Traditional settlements		Estate quarters		Orang Asli settlements		Total	
	Num.	%	Num.	%	Num.	%	Num.	%	Num.	%
<b>1. Location (State)</b>										
Johor	61	46.6	21	9.0	22	26.5	4	7.1	108	21.4
Kelantan	26	19.8	42	17.9	0	0.0	14	25.0	82	16.3
Pahang	24	18.3	42	17.9	61	73.5	17	30.4	144	28.6
Perak	20	15.3	61	26.1	0	0.0	21	37.5	102	20.2
Terengganu	0	0.0	68	29.1	0	0.0	0	0.0	68	13.5
<b>2. Race</b>										
Malay	108	82.4	209	89.3	20	24.1	0	0.0	337	66.9
Chinese	2	1.5	23	9.8	0	0.0	0	0.0	25	5.0
Indian	21	16.0	1	0.4	9	10.8	0	0.0	31	6.1
Orang Asli	0	0.0	1	0.4	2	2.4	56	100.0	59	11.7
Non-Citizen	0	0.0	0	0.0	52	62.7	0	0.0	52	10.3
<b>3. Age</b>										
15-29	7	5.3	14	6.0	20	24.1	11	19.6	52	10.3
30-59	66	50.4	144	61.5	62	74.7	42	75.0	314	62.3
60-74	54	41.2	64	27.4	1	1.2	3	5.4	122	24.2
>74	4	3.1	12	5.1	0	0.0	0	0.0	16	3.2
<b>4. Num. of children</b>										
No child	10	7.6	31	13.2	29	34.5	8	14.3	78	15.5
<3	23	17.6	48	20.5	29	34.5	16	28.6	116	23.0
4-6	79	60.3	115	49.1	25	29.8	25	44.6	244	48.4
7-9	17	13.0	27	11.5	0	0.0	5	8.9	49	9.7
10-12	1	0.8	12	5.1	0	0.0	2	3.6	15	3.0
>12	1	0.8	1	0.4	0	0.0	0	0.0	2	0.4

### 3.2. Education effect of MCO and Pandemic COVID-19

Children's learning activities and neighborhood environment arising from the change in the readiness of society to receive virtual education, provision of technological tools, broadband access, and barriers in terms of financial provision to buy gadgets. All of these present various issues and problems and lead to new discoveries which have implications for practices or policies that need to be improved in the education system. According to UNESCO, on March 18, 2020, a total of 107 countries in the world enforced school closures involving 862 million students worldwide [2]. The reality of the COVID-19 epidemic has taught the country a lesson in building strength or capability in our education system by providing a more efficient broadband system.

Several direct implications can be seen as a result of the response to the COVID-19 outbreak (Table 3). Implications in terms of the willingness of parents, especially in remote areas, to provide facilities

capable of internet access, the provision of gadgets such as mobile phones and laptops with limited platforms such as the use of Whatsapp, Telegram, Youtube or which can have high bandwidth access using Zoom, Google Meet as better face to face alternatives. The government's move to introduce MCO, every individual has to be in their respective home. Of course, the way or method of education at every level of education needs to be changed completely online. For students who have high bandwidth access, it may not be a problem to use online teaching. Online teaching allows students to improve their lifelong learning skills. Looking at the spread of the COVID-19 epidemic as well as the challenges that need to be addressed, while education needs to continue.

**Table 3.** Children learning and education during MCO and pandemic COVID-19 (n=504)

Education impact	Structured settlements		Traditional settlements		Estate quarters		Orang Asli settlements		Total	
	Num.	%	Num.	%	Num.	%	Num.	%	Num.	%
<b>1. Children's main activity during MCO</b>										
Stay in the house	93	71.0	160	68.4	19	22.3	31	55.4	303	60.1
Playing outdoor	1	0.8	4	1.7	0	0.0	7	12.5	12	2.4
Follow family (farm)	1	0.8	1	0.4	0	0.0	2	3.6	4	0.8
Follow family (forest)	0	0.0	0	0.0	0	0.0	3	5.4	3	0.6
Others	2	1.5	11	4.7	0	0.0	4	7.1	17	3.4
No children at home	34	26.0	58	24.8	64	77.1	9	16.1	165	32.7
<b>2. Hours of monitoring children's learning</b>										
No monitoring	41	31.3	73	31.2	6	7.2	14	25.0	134	26.6
1-4 hours/day	37	28.2	74	31.6	5	6.0	31	55.4	147	29.2
5-8 hours/day	12	9.2	27	11.5	6	7.2	1	1.8	46	9.1
9-12 hours/day	6	4.6	0	0.0	1	1.2	0	0.0	7	1.4
13-20 hours/day	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
21-24 hours/day	1	0.8	2	0.9	1	1.2	1	1.8	5	1.0
No children at home	34	26.0	58	24.8	64	77.1	9	16.1	165	32.7
<b>3. Children learning space at home</b>										
Yes	49	37.4	74	31.6	11	13.3	24	42.9	158	31.3
No	48	36.6	102	43.6	8	9.6	23	41.1	181	35.9
No children at home	34	26.0	58	24.8	64	77.1	9	16.1	165	32.7
<b>4. Network disruption</b>										
No disruption	68	51.9	94	40.2	10	12.0	25	44.6	197	39.1

Education impact	Structured settlements		Traditional settlements		Estate quarters		Orang Asli settlements		Total	
	Num.	%	Num.	%	Num.	%	Num.	%	Num.	%
=50%	19	14.5	44	18.8	7	8.4	7	12.5	77	15.3
>75%	10	7.6	38	16.2	2	2.4	15	26.8	65	12.9
No children at home	34	26.0	58	24.8	64	77.1	9	16.1	165	32.7
<b>5. Cost for home learning equipment</b>										
None	44	33.6	85	36.3	8	9.6	27	48.2	164	32.5
RM1-500	28	21.4	55	23.5	7	8.4	20	35.7	110	21.8
RM501-1500	11	8.4	24	10.3	3	3.6	0	0.0	38	7.5
RM1501-3000	10	7.6	9	3.8	1	1.2	0	0.0	20	4.0
>RM3000	4	3.1	3	1.3	0	0.0	0	0.0	7	1.4
No children at home	34	26.0	58	24.8	64	77.1	9	16.1	165	32.7
<b>6. Enthusiasm to go back to school</b>										
Daily	17	13.0	23	9.8	3	3.6	15	26.8	58	11.5
Weekly	23	17.6	46	19.7	4	4.8	11	19.6	84	16.7
Monthly	13	9.9	26	11.1	7	8.4	4	7.1	50	9.9
Never	44	33.6	81	34.6	5	6.0	17	30.4	147	29.2
No children at home	34	26.0	58	24.8	64	77.1	9	16.1	165	32.7

However, out of 234 HH in traditional settlements approached, 58 HH or 24.8% stated no children live together with them. Similarly, in the structured settlements, 34 HH or 26% of the 131 HH stated the same matter. As for the estate quarters, 64 HH or 77.1% of their children did not live with them. Meanwhile, 9 HH or 16.1% at Orang Asli settlements stated the same. This is probably because most of the groups of HH responded to are senior citizens. Meanwhile, a part of HH surveyed, such as in the estate quarters, consisted of employees who lived with fellow employees and did not bring families. In addition, for the rest of HH, the children no longer live together with them because they have built their own families and due to earning constraints that force them to earn a living elsewhere. Based on the percentage for the main activities of children during the MCO period, it was found that the percentage of number (N) HH involved in the children staying indoors with the family was high at 90.9% in traditional settlements, 95.9% in structured settlements, 100% in estate quarters as well as 66% in Orang Asli settlements. The overall survey revealed that children were with their families during the MCO period with an overall percentage (N) of 89%.

Generally, not many people understood the importance of learning space until the COVID-19 hit. Learning space for children to study at home throughout the MCO period is very important. This is because children can focus on the online learning process. Online learning requires students to focus on what the teachers are discussing. The provision of space is an important thing in creating a conducive atmosphere for children who are learning. The provision of learning space is spared from things that distract attention (Table 3).



### 3.3. Choice and use of indoor space and quarantine

The majority of remote communities are more likely to choose their own home as a place of quarantine in case of the disease to the HH, 326 (64.7%), and a household member 312 (61.9%). For HHs, only 79 (15.7%) were more likely to be quarantined in quarantine centers, and 99 (19.6%) were more likely to be quarantined in hospital wards. As for household members, only 69 (13.7%) were likely to be quarantined at quarantine centers and 123 (24.4%) were likely to be quarantined in hospital wards. The tendency of household heads to quarantine themselves or household members at home is likely because they think they have rooms available for that purpose. Table below shows that 290 (57.5%) of HH reported they had a special room for that purpose (Table 4).

**Table 4.** Availability and choices of location/space for quarantine (n=504)

Information	Structured settlements		Traditional settlements		Estate quarters		Orang Asli settlements		Total	
	Num.	%	Num.	%	Num.	%	Num.	%	Num.	%
<b>1. Availability of room(s) for quarantine</b>										
Yes	88	67.2	144	61.5	43	51.8	15	26.8	290	57.5
No	43	32.8	90	38.5	40	48.2	41	73.2	214	42.5
<b>2. Choice for self-quarantine</b>										
Home	94	71.8	160	68.4	42	50.6	30	53.6	326	64.7
Quarantine center	14	10.7	32	13.7	22	26.5	11	19.6	79	15.7
Hospital	23	17.6	42	17.9	19	22.9	15	26.8	99	19.6
<b>3. The choice for self-quarantine (family members)</b>										
Home	92	70.2	149	63.7	42	50.6	29	51.8	312	61.9
Quarantine center	12	9.2	29	12.4	17	20.5	11	19.6	69	13.7
Hospital	27	20.6	56	23.9	24	28.9	16	28.6	123	24.2

However, there are doubts over the issue of density in the internal space of the HH's residential units in general. From the survey results in the field, remote housing is very different from the standard housing in the city, where the design of housing in the city is subject to the standard floor area of space. Results from the fieldwork show the perception of crowded by HH in the indoor space is dubious. Most of the respondents, 298 (59.1%), said at least seven people would make conditions in the living room crowded. While 237 (47%) of respondents said, at least seven people would make conditions in the dining room crowded. More than 65% of respondents stated that the bedroom would become crowded when populated by three or fewer people (Table 5).

**Table 5.** Perception of crowding at home (n=504)

Num. of people in a space (At one time)	Perceived crowding in the living area		Perceived crowding in the dining area		Perceived crowding in bedrooms	
	Num.	%	Num.	%	Num.	%
1. Less than two people	1	0.2	7	1.4	170	33.7
2. Three people	1	0.2	12	2.4	170	33.7
3. Four people	82	16.2	99	19.6	75	14.9
4. Five people	59	11.8	76	15.1	48	9.5
5. Six people	63	12.5	73	14.5	13	2.6
6. Seven and above	298	59.1	237	47.0	28	5.6

As shown in Table 6, the tendency for HH to choose home as a quarantine place is likely due to their ability to the monitoring of the movement of social activities throughout the internal space of their house. The findings showed that the living room was the most monitored space (39.1%) at the high monitoring level, which is the most active space for social activities, and the kitchen is in second (24.6%). At the same time, the space for quarantine use (Bedroom) is ranked third (21.2), which is among the most active spaces of social activities and the most passive spaces of social activities. They are almost the same result if we look at the Bedroom position if it is measured at the medium monitoring level where the Bedroom is at the most passive of social activities (Bedroom 18.3% and Toilet/bath 15.5%). While at a low monitoring level, The Bedroom is also among the most passive spaces (Living 11.3% and 10.3%) and active spaces (Dining 22% and Toilet/Bath 43.1%).

**Table 6.** Indoor space monitoring during pandemic COVID-19 by households (n=504)

Perceived space monitoring	High frequency		Medium frequency		Low frequency	
	Num.	%	Num.	%	Num.	%
1. Living area	197	39.1	97	19.2	57	11.3
2. Kitchen	124	24.6	120	23.8	52	10.3
3. Bedrooms	107	21.2	92	18.3	67	13.3
4. Dining area	28	5.6	117	23.2	111	22.0
5. Toilet/Bathrooms	48	9.5	78	15.5	217	43.1

#### 4. Conclusion

COVID-19 is undeniably imposed various ramifications in the livelihood of the people in all parts of peninsular Malaysia. The sub-sections discuss the outcomes of the socio-demographic of the research subjects ranging from various categories of semi-urban and rural settlements, identify how pandemic and MCO have shaped the nature of education as well as the new normal for PdPR and the changing roles of respondents to accommodate home-based learning process. Students in the rural area have difficulty to practise online learning because the internet and television network is poor there. They also had a restriction on purchasing the good quality cheap, and suitable devices. Teachers still send learning modules to students, either sending it to students' homes or the parents will pick the modules up at school every weekend. The teaching Staff also had difficulty to deliver teaching modules to the student when the internet network was poor. It is also a challenge to prepare the teaching materials that not be

dense with text or visuals alone but rather a mixture with audio or simulations to make the student more alert and interactive. The pedagogy practiced by the educators should be able to adapt with the current situation like this.

The study also explained in detail the impacts of pandemic on decisions for respondents in selecting and utilizing the indoor spaces for quarantine, isolation, and to cater to various purposes, including WFH and PdPR activities. For the parents, online learning and stay at home activities (either for home quarantine or for WFH and/or PdPR activities, posed a unique challenge for providing dedicated and conducive indoor spaces as well as providing the children with learning equipment or gadgets and at the same time maintaining the welfare of the family. It is indeed a very challenging adjustment process (and still adjusting) since the majority of respondents did not anticipate that the magnitude of COVID-19 would significantly alter almost all parts of our daily routine and activities.

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