

## The Relationship between Gadget Usage and the Mental Emotional State of Schoolchildren during the COVID-19 Pandemic

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### ABSTRACT

**Introduction:** The COVID-19 pandemic and associated public health measures have disrupted the mental health or well-being of children in some way. It is already evident that the increased use of gadgets and excessive screen time during the COVID-19 pandemic among children and adolescents has a significant influence on mental and emotional well-being among children.

**Objective:** This study aimed to determine the association between device usage and the mental-emotional state of schoolchildren during the COVID-19 pandemic.

**Methods:** This is a quantitative cross-sectional study. A questionnaire survey was employed using the Malay Parent-Report Version of the Strengths and Difficulties Questionnaire, conducted among 232 parents of schoolchildren aged 7 to 12 years. Descriptive and inferential statistics were used to draw insights from the data.

**Results:** The findings indicate a statistically significant relationship between gadget usage (including the duration of playing a gadget per day, the frequency of playing a gadget per week, the type of gadget, ownership of the gadget, and the use of a gadget) and mental emotional state among schoolchildren ( $p$  value  $< 0.05$ ).

**Conclusion:** The outcomes of the study indicate that the pattern of electronic gadget usage has significantly impacted schoolchildren's mental and emotional states.

**Keywords:** Gadget usage, Mental emotional state, Schoolchildren, COVID-19 pandemic

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## INTRODUCTION

COVID-19 was classified as a global pandemic by the World Health Organization (WHO) on March 12, 2020, and some preventive steps were ordered to be implemented to stop the virus from spreading. In addition to these public health measures, citizens were encouraged to practise social distancing, which entails keeping two metres between oneself and another; avoiding social gatherings; limiting contact with the elderly and the sick; avoiding common greetings such as handshakes; and avoiding crowded places or non-essential gatherings (1). Education is one of the sectors most severely hit by the COVID-19 epidemic. Because of the need to combat the spread of the virus, many schools and universities have shifted to an online learning mode. Hence, the use of gadgets has become a compulsion in daily life among schoolchildren, and the time spent with gadgets has been rising three times faster than before the pandemic (2).

Schoolchildren are required to adapt to online learning in order for education to continue as usual, despite their diverse difficulties. These types of rapid changes may affect their mental health or well-being in some way. Some of them may experience depression and anxiety as a result of the pandemic and associated quarantine, as has been reported (3). Research has indicated that the frequency or intensity of children's gadget use will affect their mental and emotional development. For instance, a study conducted in Bangladesh among parents with children aged 5 to 15 years revealed that a large proportion of children experienced emotional well-being disruption during the lockdown period (4). In addition, the increased use of gadgets and excessive screen time during the COVID-19 pandemic among children and adolescents has a significant influence on mental and emotional wellbeing among children (5-11). Some children were reported to have experienced depressive symptoms, difficulty concentrating, anxiety, being touchy, and easily irritated (11). Consequently, children experiencing stress have been found to have lower self-directed learning readiness during online classes (12).

Many studies have proven the psychological impact on schoolchildren due to COVID-19 and the changes in traditional classrooms to an

online environment. However, there is lack of data about the correlation between the mental emotional state of schoolchildren and the use of gadgets during the COVID-19 pandemic in Malaysia. Thus, this study sought to determine the relationship between the use of gadgets and mental emotional state among Malaysian schoolchildren during the COVID-19 pandemic.

## METHODS

A quantitative cross-sectional study was carried out among parents of schoolchildren in Kuantan, Pahang, Malaysia in February 2021. A total of 232 parents of the schoolchildren participated in the study following a convenient sampling method. The inclusion criteria for parents were (i) having schoolchildren aged 7-12 years and (ii) being able to read and understand Bahasa Malaysia or English. Parents who met the inclusion criteria were invited to participate in this study. The data was collected upon obtaining approval from the Kulliyah of Nursing, the Postgraduate and Research Committee (KNPGRC), and the IIUM Research Committee (IREC). Due to COVID-19, data collection was carried out using an online platform, which was the WhatsApp application. One of the teachers was assigned as the contact person for the survey. The link to the online questionnaire was forwarded to the contact person before being sent to the parents via the parents-teachers WhatsApp group. A consent form and an information sheet, including the explanation of the study's aim, process, confidentiality, and right to withdraw, as well as the researcher's contact information, were provided on the first page of the questionnaires. Parents who agreed were required to answer all questions that reflected their children's situation. It took approximately 15-20 minutes to complete the survey.

## Instruments

A set of questionnaires comprising three parts were used to collect the data: (i) Part A is the socio-demographic data; (ii) Part B is the gadget usage; and (iii) Part C is the Malay Parent-Report Version of the Strengths and Difficulties Questionnaire (SDQ) (13). The socio-demographic details comprise age, gender, race, years of study, and average monthly

family income (RM). The gadget usage details consist of the following: the duration of playing a gadget in a day (hour); the frequency of playing a gadget in a week (day); the type of gadgets used; the ownership of a gadget; and the use of a gadget. The SDQ consists of 25 items on psychological attributes, divided into 5 subscales: emotional symptoms; behavioural problems; hyperactivity/inattention; peer relations problems; and prosocial behaviours. All items are given 3 choices: "Not true"; "Somewhat true"; and "Certainly true". The total score is summed into three categories: normal (0-25), borderline (26-50), and abnormal (51-75) mental emotional state. The internal consistency of the SDQ was acceptable, with a Cronbach's alpha coefficient of 0.78.

**Data analysis**

Descriptive analysis was used to analyse the socio-demographic characteristics of the participants, the gadget usage, and the mental emotional state of schoolchildren. The Chi-square test (X2) was used to determine the relationship between gadget usage and mental emotional state. All statistical analyses were computed using SPSS-25.0 software (SPSS Inc., Chicago, IL, USA) and significance was set at  $p < 0.05$ .

**RESULTS**

**Socio-Demographic profile of the Children**

Table 1 shows that the majority of children were Malay (69.0%), boys (53.1%) aged between 10 and 12 years old (53.4%) and studying between standard 4 and 6 (53.4%). With regards to parents' monthly income, most of the children were from an average household income of RM2500 to RM5000 (47.0%).

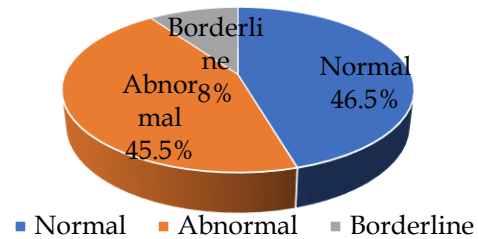
**Mental Emotional Distribution of the Participants**

Figure 1 depicts the distribution of mental emotional state of children. Findings suggest that the percentage of children who have normal and abnormal levels of mental emotional state is comparable with 46.5% and 45.5%, respectively, while only 8% of the children have a borderline level of mental emotional state.

**Table 1:** Demographic profile of the children

Variables	Frequency (n)	Percentage (%)
Age		
7 - 9 years old	108	46.6
10 - 12 years old	124	53.4
Gender		
Boy	123	53.1
Girl	109	46.9
Race		
Malay	160	69.0
Chinese	35	13.8
Indian	37	17.2
Year of study		
Standard 1-3	108	46.6
Standard 4-6	124	53.4
Average family monthly income		
Below RM 2500	40	17.2
RM 2500 - RM 5000	109	47.0
RM 5001 and above	83	35.8

**Figure 1:** Distribution of Mental Emotional State



**The Gadget Usage Pattern and the Mental Emotional State of Schoolchildren**

Table 2 presents the pattern of gadget usage among primary school students. Findings suggest that the time spent by most children (42.2%) playing gadgets was between 6 to 10 hours, with approximately 6 to 7 days in a week (52.1%). Furthermore, the findings show that the majority of the children (31%) used the device for video games and social media (22.4%), with only a few (16.4%) using it for educational purposes. In terms of gadget ownership, the majority of children (63.8%) owned a gadget, either smartphones (53%), tablets (27.6%), or computers (19.4%).

**The Relationship Between Gadget Usage and Mental Emotional State**

As presented in Table 2, the Chi-square test suggests that there was a statistically significant

relationship between gadget usage (including the duration of playing gadgets in a day, frequency of playing gadgets in a week, type of gadgets, ownership of gadgets, and the use of gadgets) and mental emotional state among primary school students with p value < 0.05 and X<sup>2</sup> of 27.04, 12.72, 21.45, 12.36, and 23.39 respectively. Furthermore, the findings show that children who had normal mental states spent their time playing gadgets between 6 to 7 days in a week (19.0%) and less than 5 hours in

a day (22.4%), whereas children who spent more than 6 hours playing gadgets in a day (38.7%) and 6 to 7 days in a week (36.1%) reported having abnormal mental emotional states. Finally, the findings highlight that most children who owned gadgets had abnormal levels of mental emotional state (34.1%), compared to 10% of children who did not own the gadget.

**Table 2:** The Relationship Between Gadget Usage and Mental Emotional State (N = 232)

Gadget usage	n (%)	Mental emotion state			p-value (X <sup>2</sup> )
		Normal n (%)	Borderline n (%)	Abnormal n (%)	
Duration in a day					< 0.01* (27.04)
< 5 hours	94 (40.5)	52 (22.4)	19 (8.2)	26 (11.2)	
6 – 10 hours	98 (42.2)	27 (11.6)	15 (6.5)	53 (22.9)	
> 10 hours	40 (17.3)	15 (6.5)	12 (5.2)	13 (5.5)	
Frequency in a week					
1 – 3 days	51 (22.0)	19 (8.2)	14 (6.0)	17 (7.3)	0.013* (12.72)
4 – 5 days	60 (25.9)	30 (12.9)	14 (6.0)	16 (6.9)	
6 – 7 days	121 (52.1)	44 (19.0)	18 (7.6)	60 (26.1)	
Type of gadgets					
Smartphone	123 (53.0)	60 (26.1)	23 (9.9)	40 (17.3)	<0.01* (21.45)
Tablet	64 (27.6)	18 (7.6)	11 (4.5)	35 (15.3)	
Computer	45 (19.4)	15 (5.2)	12 (5.2)	18 (7.6)	
Ownership of gadget					
Yes	148 (63.8)	53 (22.8)	27 (11.6)	79 (34.1)	0.002* (12.36)
No	84 (36.2)	30 (12.9)	20 (8.6)	23 (10.0)	
Use of gadget					0.003* (12.39)
Study purposes	38 (16.4)	15 (6.5)	9 (3.9)	12 (5.2)	
Social media	52 (22.4)	11 (4.5)	9 (3.9)	31 (13.4)	
Basic phone services	28 (12.1)	10 (4.3)	6 (3.1)	11 (4.5)	
Playing video games	72 (31.0)	27 (11.6)	13 (5.5)	27 (11.6)	
Watching movies or videos	42 (18.1)	32 (13.8)	7 (3.0)	12 (5.2)	

\*p-value < 0.05

**DISCUSSION**

This study is intended to assess the relationship between gadget usage and the mental emotional states of primary schoolchildren during the COVID-19 pandemic. The findings revealed that the schoolchildren had a considerable level of gadget usage during the COVID-19 pandemic, in which most of them spent time playing gadgets for around 6 to 10

hours a day, approximately 6 to 7 days a week. This finding was consistent with previous research that discovered a high intensity of gadget usage for a duration of more than 120 minutes a day and that a single usage was more than 75 minutes (14-16). This has raised a concern that children may become dependent on gadgets, which may have negative impacts on their overall wellbeing. As reported in a study, the use of gadgets for too long a duration

can contribute to aggressive levels in children's emotional state, and that a child may become insensitive to the environment around him/her (17).

This study highlights the highest proportion of children who spend more than 6 hours playing gadgets in a day and 6-7 days in a week reported to have abnormal mental emotional states compared to children who have normal mental states. However, the duration of time spent playing in a day for this group of children was less than 5 hours a day. This finding is consistent with a previous study that discovered children who were reported to have mental emotional abnormalities were among those with the highest frequency of playing a gadget (6-7 days a week). Nonetheless, the duration of playing with gadgets for children who have abnormal mental emotional state? in that study was more than 10 hours a day (15). Other studies reported that children who use gadgets for more than 2 hours per day have an increased risk of mental problems, including depression, anxiety, ADHD, mood disorders, and suicidal thoughts (18).

The finding also suggests that there was a statistically significant relationship between gadget usage and mental emotional state among school-aged children, indicating that the (i) duration of playing gadgets in a day, (ii) frequency of playing gadgets in a week, (iii) type of gadget used, (iv) ownership of the gadget, and (v) the use of gadgets affected the mental emotional state of the schoolchildren. Similarly, a significant positive relationship between the duration of playing a gadget and the feelings of depression in children when playing a gadget for more than 6 hours a day has been reported by previous studies in Indonesia (14-15). Another study reported that there was a substantial correlation between mental health conditions and mobile device usage (3, 18 -19). Negative behaviour can emerge if children are exposed too young to gadgets, especially if they choose to watch movies rather than playing games (16-17).

### Limitation

This study has several limitations. First, data were collected during the endemic stage of the COVID-19 in Malaysia. Therefore, it might not reflect the early phase of the pandemic when

the number of confirmed cases increased sharply. Second, the mental emotional state score of the children might not totally related to gadget usage only, as the pandemic might had exposed the schoolchildren with other challenges. Third, due to the nature of the cross-sectional design applied in this study, a further study explores by using the root cause analysis of psychosocial issues through interviews, case control study, experimental study, or observation of students, parents, and teachers. Forth, participation in completing questionnaires distributing online due to the pandemic may have resulted in bias. Lastly, the sample size is small and further studies with larger samples are needed to represent the population in general.

### CONCLUSION

According to the findings, gadget usage, such as the duration of playing a gadget in a day, the frequency of playing gadgets in a week, the type of gadget, gadget ownership, and gadget use, significantly correlates with mental emotional state among schoolchildren during the COVID-19 pandemic. This study provides empirical evidence to support that inappropriateness of gadget usage in a child's day and week among schoolchildren has contributed to an abnormal level of mental emotional state. A health-related awareness programme for students, parents, and teachers can be promoted. More studies need to be conducted with regard to this issue to address the problem more precisely and to further strengthen mitigating strategies in the near future.

### CONFLICT OF INTEREST

The authors declare they have no conflict of interest in this study.

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### AUTHOR CONTRIBUTIONS

**LSP:** preparing the draft of manuscript, analyse the data and support with intellectual content.  
**SHAH:** editing the final draft of the manuscript.  
**NAK:** involved in data collection, data analysis and support with intellectual content.

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