

Psychosocial impact of home-based learning among students during the COVID-19 Pandemic in Singapore

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SUMMARY

The COVID-19 pandemic has forced students to adapt to Home-Based Learning (HBL) for varying durations globally. We hypothesize that HBL has had a negative psychosocial impact on secondary school students due to an increase in the time spent on digital gadgets, reduction in physical activity, and social isolation. After surveying 69 secondary school students (8-14 May 2020) during the “circuit breaker”, which was a nationwide stay-at-home order implemented as a preventive measure by the government of Singapore in response to the COVID-19 pandemic, we compare their time spent on digital gadgets and other activities before and during HBL and grade their feelings during HBL on a Likert scale. Our results show that the students spent significantly more time on digital gadgets, online web-based meetings, social media and multimedia during HBL compared to before HBL. They also spent significantly less time on physical exercise and meeting friends. During HBL, the majority of students felt bored most of the time (45, 65.2%), and, missed meeting friends (61, 88.4%), missed going to school (56, 81.1%) and felt trapped at home (45, 65.2%) at least some of the time. Although most students (60, 86.9%) started a new hobby during HBL, and some reported positive changes in their outlook towards life, the majority of students (39, 56.5%) preferred going to school over HBL. Overall, secondary school students in Singapore have adapted well to HBL and have had opportunities to develop new skills; however, most still prefer going to school over learning in the home environment.

INTRODUCTION

The Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) started wreaking havoc around the world soon after the first officially reported cluster of pneumonia-like illness in Wuhan, China on 31 December 2019 (1). The resulting COVID-19 pandemic, with well over 196 million cases and 4.2 million deaths reported worldwide by 1 August 2021 (2), has significantly impacted many aspects of daily living. During the pandemic, social distancing, enhanced personal hygiene measures, and travel restrictions were recommended to the wider community. In addition, students attending schools in many countries around the world have

had to move towards online distance learning in the form of Home-based Learning (HBL) to varying degrees.

The virus reached Singapore’s shores in late January 2020 and started manifesting local community transmission in the subsequent months. This led to progressive tightening of restrictions in Singapore, beginning with raising the Disease Outbreak Response System CONdition (DORSCON) level to Orange on 7 February 2020, just one tier short of the top category (3). In an effort to reduce the risk of spread of the infection within the community, Singapore adopted a “circuit breaker” with enhanced restrictions from 7 April to 1 June 2020 (3). The “circuit breaker” was a nationwide stay-at-home order implemented as a preventive measure by the government of Singapore in response to the COVID-19 pandemic.

During the “circuit breaker” period, the Ministry of Education in Singapore made it mandatory for schools to have full-time HBL for students (4). While the comfort of being at home was most welcome, HBL brought up a variety of new challenges for students to cope with. Some key examples include the feeling of being confined to the limited space at home with reduced outdoor activity, reduced physical interaction with their peers, and increased time spent on digital gadgets.

This study aims to understand the psychosocial impact of HBL on secondary school students and how well they coped with the unique HBL experience during the COVID-19 pandemic in Singapore. We hypothesize that HBL had a negative psychosocial impact on secondary school students due to an increase in the time spent on digital gadgets, reduction in physical activity, and social isolation. From our targeted online survey, we found that secondary school students in Singapore spent significantly more time on digital gadgets and social media and less time meeting friends and engaging in physical activity during HBL compared to before HBL. Although the students appear to have adapted well to HBL and have had opportunities to develop new skills and a positive outlook towards life during HBL, they still prefer going to school over learning in a home environment.

RESULTS

A total of 69 secondary school students responded to the online survey. We chose to distribute an online survey because of its feasibility during the nationwide stay-at-home order implemented in response to the COVID-19 pandemic. There were 41 male (59.5%) and 28 female (40.5%) respondents. The mean age was 13.54 ± 1.66 years. More than three-quarters of the respondents (55, 79.6%) were between 12-14 years of age.

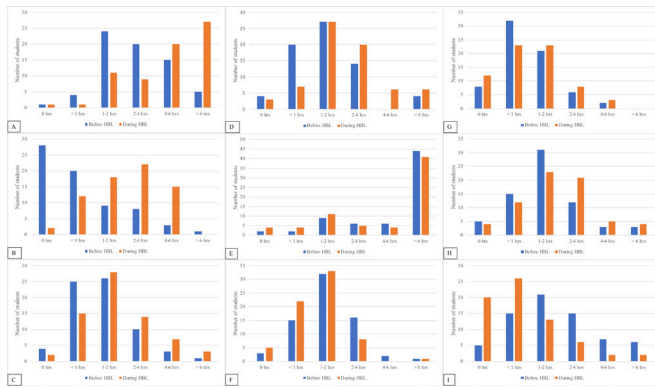


Figure 1: The average number of hours spent per day on various activities by secondary school students before and during Home-based Learning (HBL) (N=69). Bar graphs showing time spent on activities against proportion of students. (A) Total time spent on digital gadgets. (B) Time spent on online web-based meetings. (C) Time spent on social media. (D) Time spent on multimedia. (E) Time spent on relaxation and sleep. (F) Time spent on physical activity. (G) Time spent on reading books. (H) Time spent with family. (I) Time spent with friends.

The average duration of HBL was 9.3 weeks (8-15 weeks). The mean distance from home to school was 11km (0.75-30km). Two-thirds of the surveyed students (46, 66.2%) had their exams/term-assessments either cancelled or postponed due to the ongoing COVID-19 pandemic. Nearly three-quarters of the respondents had at least one sibling to accompany them at home during HBL (50, 72.5%).

The average number of hours spent per day on various activities before and during HBL period are shown in **Figure 1**. The time spent on digital gadgets in a day was between one to four hours for most students (44, 63.7%) before HBL, but more than four hours for most of the students (47, 68.1%) during HBL (**Figure 1A**). While most of the students (48, 69.5%) spent less than one hour on online web-based meetings every day before HBL, over three-fourths of the

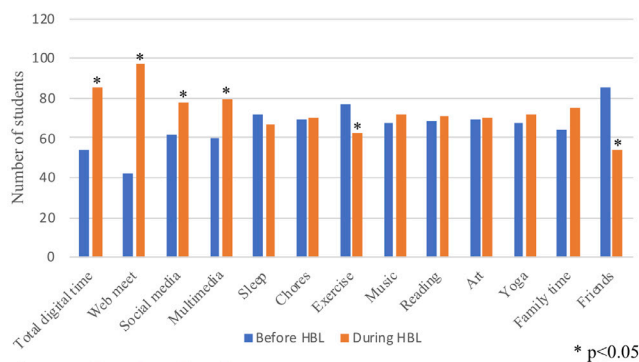


Figure 2: Comparison of mean ranks for time spent by secondary school students on various activities before and during Home-based Learning (HBL) (N=69). Mean ranks were calculated for the time spent on various activities before and during HBL. Compared to before HBL, the time spent on digital gadgets ($p < 0.01$), online web-based meetings ($p < 0.01$), social media ($p = 0.013$), and multimedia ($p < 0.01$) was significantly more during HBL. However, significantly less time was spent on physical exercise ($p = 0.02$) and meeting friends ($p < 0.01$) during HBL compared to before HBL. Statistically significant differences between time spent before and during HBL are indicated with an asterisk (*).

students (55, 79.7%) spent more than one hour on online web-based meetings during HBL (**Figure 1B**). The number of students who spent more than one-hour per day on physical activity reduced from 51 students (73.9%) before HBL to 42 students (60.8%) during HBL (**Figure 1F**). The time spent with friends was more than one hour per day for the majority of students (49, 71%) before HBL, but decreased to less than one hour per day during the HBL for two-thirds of the students (46, 66.6%) (**Figure 1I**).

Mean ranks were calculated for the time spent on various activities before and during HBL. The time spent on various activities during HBL was significantly more for digital gadgets (85.2% vs 53.8%, $p < 0.01$), online web-based meetings (97.2% vs 41.8%, $p < 0.01$), social media (77.6% vs 61.4%, $p = 0.013$), and multimedia (79.5% vs 59.5%, $p < 0.01$) compared to before HBL (**Figure 2**). However, they spent significantly less time on physical exercise (62.4% vs 76.6%, $p = 0.02$) and meeting friends (54.0% vs 85.0%, $p < 0.01$) during HBL compared to before HBL (**Figure 2**).

Schools in Singapore are broadly divided into local and international schools. An almost equal proportion of students attended international schools (35, 50.7%) and local public schools (34, 49.3%) in the survey. We asked the respondents to indicate their current level of happiness on a visual analogue scale of 1 to 10, where “1” was extremely unhappy and “10” was extremely happy. About two-thirds of the respondents (45, 65.2%) gave a score greater than or equal to “5” on the visual analogue scale (mean score = 5.4). Although the curricula, school term dates, and HBL dates varied between Ministry of Education affiliated local schools and international schools, there was no strong correlation (multiple correlation coefficient $R = 0.10$) between the level of happiness with type of school (public vs international) ($R = -0.61$, $p = 0.619$), duration of HBL ($R = -0.26$, $p = 0.833$), and number of siblings at home ($R = -0.187$, $p = 0.124$). Only a few students (8, 11.6%) preferred HBL over going to school. There was also no significant correlation between students’ preference for HBL over going to school with respect to type of school ($R = -0.094$, $p = 0.442$), distance of home from school ($R = 0.062$, $p = 0.61$), and duration of HBL ($R = -0.198$, $p = 0.107$). Most of the surveyed students were comfortable with the e-learning activities used during HBL. On a visual analogue scale of 1 to 10 where “1” was “awful” and “10” was “fantastic,” more than two-thirds (47, 68.1%) indicated a score of greater than or equal to “5” (mean score = 5.6).

The respondents were asked to grade positive and negative feelings experienced during HBL on a Likert scale ranging from 1 to 5, where “1” stands for “none of the time” and “5” stands for “all the time.” On this scale, “some of the time” meant > 25% to < 50% of time, and “often/most of the time” meant > 50% to < 75% of the time. Almost half of the respondents (34, 49.2%) reported that they did not enjoy the HBL experience (**Figure 3A**). More than three-quarters of the respondents (45, 65.2%) felt bored most of the time during HBL (**Figure 3B**). The majority of respondents missed meeting their friends (61, 88.4%), missed going to school (56, 81.1%), and felt trapped at home (45, 65.2%) at least some of the time (**Figure 3B**). More than half of the students had trouble concentrating on their studies and felt distracted (40, 57.9%), while many felt restless and fidgety (46, 66.6%) at least some of the time during HBL (**Figure 3B**). There were no significant differences in feelings associated with HBL between students

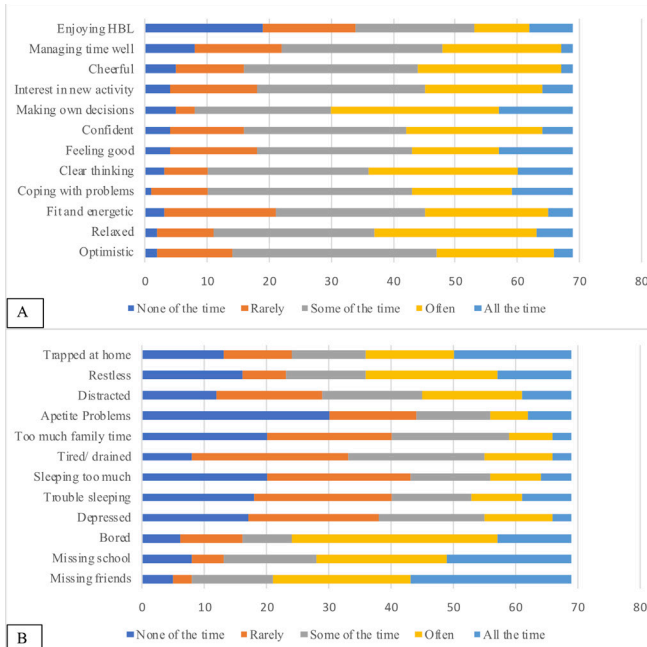


Figure 3: Frequency of positive and negative feelings reported by secondary school students during Home-based Learning (HBL) (N=69). The students graded positive and negative feelings experienced during HBL on a Likert scale ranging from 1 to 5, where “1” stands for “none of the time” and “5” stands for “all the time.” On this scale, “some of the time” meant > 25% to < 50% of time, and “often/most of the time” meant > 50% to < 75% of the time. (A) Positive feelings reported by students during HBL. (B) Negative feelings reported by students during HBL.

attending local versus international schools.

A vast majority of students (60, 86.9%) started new activities, such as developing a new hobby/skill during HBL. More than half of the students surveyed (39, 56.5%) indicated that they enjoyed the increased time they got to spend with their family during HBL. The COVID-19 pandemic also appears to have positively changed the outlook of many respondents towards life. Based on students’ responses, their change in outlook towards life due to the pandemic are tabulated in **Table 1**.

DISCUSSION

The COVID-19 pandemic posed unprecedented challenges and impacted secondary school students in more ways than one. In addition to the once-in-a-lifetime experience of the pandemic and the feelings associated with social isolation, widespread suffering, and mortality in the wider community, students had to adapt to full-time HBL. We report the psychosocial impact of HBL on secondary school students in Singapore during the COVID-19 pandemic.

Learning from the comfort of one’s home, or “homeschooling,” has been a well-known, but less formal, way of education in many countries around the world (5). Until recently, it was limited to very few isolated families/communities who were often dissatisfied with current methods of school-based education for various reasons. The full-time compulsory HBL associated with the current pandemic has been a new experience for most students who were otherwise familiar with learning primarily in the

	Positive outlook characteristics	Phrases reported by respondents	No. of students (%)
1.	Gratitude	Grateful towards God, teachers, parents, school, government	10 (14.4%)
2.	New knowledge	Importance of personal hygiene Use of information and technology Explore new activities/ hobbies	7 (10.1%)
3.	Change of perception	Change in priorities in life Learn to value time better Life is too short and unpredictable Nothing is in our hands Grades are not everything in life	6 (8.6%)
4.	Resilience	Can handle any situation Coping well despite the odds	3 (4.3%)
5.	Optimism	Life must go on no matter what	3 (4.3%)
6.	Reconcile/adjust to the situation	Make the best out of every situation	2 (2.8%)
7.	Family time	Value time with family	1 (1.4%)
8.	Determination	Self-driven attitude	1 (1.4%)
9.	Opportunity	Opportunity to improve oneself	1 (1.4%)
10.	Camaraderie	Helping each other	1 (1.4%)
	Negative outlook characteristics		
1.	Trapped feeling	No outdoor activities	6 (8.6%)
2.	Boredom	Very boring	2 (2.8%)
3.	Gloomy	Unable to meet friends	2 (2.8%)
4.	Callous	Things just happen so no need to bother	1 (1.4%)

Table 1: Change in students’ outlook towards life due to the COVID-19 pandemic.

in-person school environment. Unlike homeschooling, HBL was entirely implemented by the respective schools with a structured program using distance online learning tools. HBL may not provide the physical facilities and motivation required to excel, at least for some children who thrive only when they are with peers at an in-person school environment and challenged with some form of competition.

In our study, the total time spent on digital gadgets, online web-based meetings, social media, and multimedia significantly increased during HBL compared to before HBL as we had hypothesized. While becoming more tech savvy can be an advantage for students by allowing them to become future-ready and grow to be independent learners, there is a significant risk of increased addiction to digital gadgets. Out of the many potential side effects, an increased digital screen time and limited outdoor activity are known risk factors for the onset and progression of short-sightedness or myopia, which appears to be increasing in prevalence among children (6). The COVID-19 pandemic is likely to accelerate this process even beyond the limited duration of HBL due to an increased dependence on digital technology, remote learning, and prolonged restrictions on outdoor activity (6).

Secondary school students spent significantly less time on physical exercise during HBL, supporting our hypothesis. These findings may have important implications not only on general physical health of students due to a relative lack of physical activity, but also on their mental health because of additional issues associated with social isolation, boredom, and an increased addiction to digital gadgets. However, some students in our survey were not limited by the restrictions imposed during the lockdown and learned alternative modes of physical exercise, such as yoga. HBL also provided a

good opportunity for family bonding, as students were able to exercise along with their parents, many of whom were concurrently working from home and potentially had more time to spare for their children.

Physical interaction with peers is very important for bonding, learning, communication, and general wellbeing. We found that the time spent by students with their friends was significantly lesser during HBL compared to before HBL, confirming our hypothesis. Additionally, before HBL, students were accustomed to having face-to-face interactions with their friends. However, during HBL, whatever little time students got to spend with friends was mostly on virtual platforms, such as the phone, social media or video chats. In fact, the majority of students missed meeting their friends in person and missed going to school. On top of this, the feeling of being confined to the limited space at home with reduced outdoor activity and physical interaction with peers was a significant challenge that the students had to overcome.

The respondents to our survey reported having overall positive feelings during HBL and appeared to have adapted well to “e-learning” during HBL. This reflects their capacity to adjust to newer methods of learning and is encouraging. Despite the overall positive feelings during HBL, almost half of the students did not enjoy the HBL experience. Many of them felt bored, trapped at home, restless, and distracted. In fact, only a small minority of students preferred HBL over going to school. Public health emergencies are known to instill a variety of emotions, such as fear, anxiety, and worry among individuals (7). As many as 25% of university students reported anxiety because of the COVID-19 outbreak in China (7). The positive or negative feelings experienced by students during HBL could potentially vary based on their learning environments. However, we found no correlation between positive and negative feelings associated with HBL and the type of school (local vs international) that students attended.

Students are known to have varying preferences and styles of learning and not all students have a negative impact from learning in the home environment. Some students feel more independent, have a sense of ownership, take charge of their own study routines, and feel less distracted in the comfort of their homes (8). There is also the potential added benefit of learning under parental guidance, as many parents worked from home concurrently during the pandemic (8). Most of the students we surveyed had started a new hobby or learned a new skill during HBL, giving them a good opportunity to explore new ideas/skills in the comfort of the home environment. HBL seems to also have provided students with additional time for creative thinking, as they did not have to spend time travelling to school and had more time at their disposal. Encouragingly, in our study, many students surveyed also reported a positive change in their outlook towards life possibly due to availability of additional time for reflection. They reported feelings of gratitude, change in perception, resilience, optimism and acquisition of new knowledge, to name a few.

As HBL may need to be implemented again in the future due to unforeseen circumstances such as lockdowns, students should take HBL as an opportunity to adapt to newer e-learning tools, develop new skills/hobbies and make most of the invaluable family bonding time. On the other hand, schools, parents, and policymakers need to take note that secondary school students prefer in-person schooling over learning in a home environment suggesting that HBL may not

be the ideal mode of learning in the long-term. Hybrid models of learning with a mix of in-person schooling along with some structured intermittent HBL may help students to be better prepared for compulsory HBL whenever it is necessary in the future. This will also enable students to reap the benefits of both methods of learning while reducing the potential long-term impact of increased dependence on digital gadgets, reduced physical activity and social isolation associated with compulsory HBL.

This study had some limitations. The results of this study are based on a sample of students and may not accurately reflect the experience of the wider student community. The research was based on an online survey; direct personal interviews could have enhanced our findings, but this was not a feasible option due to the nationwide lockdown during the pandemic. As this was a remotely conducted survey, we do not know how earnestly respondents completed it, how they interpreted the questions, and whether their parents helped them with their responses. However, the quality of the responses obtained suggests that the survey was clearly understood. As this survey was conducted during HBL, there is a possibility of “recall biases,” as participants had to recollect information on the amount of time spent on various activities before the start of HBL. Separate surveys conducted before and after HBL can avoid the potential “recall biases.” The majority of students in our survey were 12-14 years old. As older students are likely to be more mature and possibly have different experiences arising from the exceptional situation, further studies with larger sample sizes to elucidate experiences among various age groups would lead to a better understanding of how HBL affects students of all ages.

MATERIALS AND METHODS

We invited secondary school students (aged 12-18 years) from both public and international schools in Singapore to participate in this cross-sectional online survey, which was conducted over a period of one week from 08 May to 14 May 2020. The online survey questionnaire to assess the psychosocial experience of HBL among secondary school students in Singapore was designed using Google Forms (<https://docs.google.com/forms/d/e/1FAIpQLSe4SqpX2u3wBNs9AXXi3gqvIsuKeEaGOINgMU4LoG-rmz69Q/viewform>). The link to the online form was forwarded to the students via school email addresses and WhatsApp group-chats. The students completed a single survey questionnaire during the week at their convenience. All responses were kept anonymous.

Besides demographic data, the respondents reported the time spent on digital gadgets, online web-based meetings, social media, multimedia entertainment, and various other activities before and during HBL. They also indicated positive and negative feelings experienced during HBL on a Likert scale. In order to understand whether they were coping well with HBL, the overall level of comfort with the e-learning and current level of happiness during HBL was recorded on a visual analogue scale. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) software version 26.0. Mean ranks were assigned for the time spent of various activities before and during HBL. A 2-tailed t-test was used to test for significance and *p* value of less than 0.05 was considered statistically significant. Multiple correlation coefficient (R) was used to look for association of

factors, such as type of school, duration of HBL, and number of siblings at home, with their current level of happiness and feelings associated with the HBL experience.

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