Original Research

The impact of schooling context through COVID-19 on strategies for reading on paper and on digital devices

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ABSTRACT

The COVID-19 pandemic significantly impacted children's lives, including school closures resulting in mandatory homeschooling. These school changes have been associated with gaps in educational attainment, and changes in children's screen time. The current study aimed to investigate the reading strategies parents used with their children, how children spent their leisure time, and children's digital reading versus reading on paper during the pandemic. The study compared these variables across three groups: in-person learners, mandated homeschoolers, and voluntary homeschoolers, with further analyses by age group. 961 North American couples with children in Grades 1-5 were surveyed, responding retrospectively on the period of January 15th, 2021, to February 15th, 2021. Voluntary homeschoolers spent more time reading both on paper and on a screen for pleasure than mandated homeschoolers and in-person learners. Families with mandated homeschoolers and in-person learners employed more reading strategies when reading on paper than on screens. These two groups also used reading strategies more frequently with paper than families who voluntarily homeschooled their children. Mandated homeschoolers use more reading strategies with their children on a screen than both in-person learners and voluntary homeschoolers. All three schooling groups used more strategies with younger children compared to older children. Voluntary homeschoolers engaged in almost all activities more often per week compared to mandated homeschoolers and in-person learners. This research highlights differences in reading habits and strategy use among children based on their schooling conditions during the pandemic, which may help explain the emerging gaps in educational attainment related to the pandemic.

Keywords: Reading Strategies, Reading Development, COVID-19, Pandemic

INTRODUCTION

The COVID-19 global pandemic altered children's lives and learning, particularly with the shift from in-person schooling to mandated online learning as part of broader pandemic containment measures[1], implemented with considerable variability.[2] Emerging research has highlighted lower-than-expected reading levels after school closures due to the COVID-19 pandemic[3-5], suggesting that these declines are linked to the closures. Importantly, parents' involvement in reading and literacy activities with their children has been shown to help mitigate pandemic-related learning losses.[6-7] Another challenge of the COVID-19 pandemic has been children's increased screen time[8-10], at a time when digital reading options are becoming increasingly available. Here we explore connections between these shifts, looking at reading habits, reading strategies use, and leisure activity time among North American elementary-aged children in different schooling contexts throughout the pandemic.

Homeschooling During the Pandemic

The COVID-19 pandemic resulted in widespread containment measures; one such measure was the implementation of online home learning, referred to as mandated homeschooling in this study.[1] The implementation of this measure varied across regions.[11] For example, in Nova Scotia, Canada, the winter break for all public schools was extended until mid-January 2021 because of the ongoing COVID-19 pandemic.[12] In contrast, students in the capital city of Newfoundland and Labrador, Canada, were required to change from in-person learning to mandated homeschooling in mid-February 2021, as the province went into lockdown to control the spread of the COVID-19 virus.[13] To assess the impacts of schooling, we surveyed families whose children were voluntary homeschoolers (i.e., homeschooling for reasons unrelated to COVID-19), mandated homeschoolers (i.e., learning at home due to COVID-19), and in-person learners (i.e., attending school in person).

Leisure Activities

Mandated lockdowns restricted outdoor activities and increased screen time for children of all ages.[14,9,8,15] These shifts were most pronounced in older children. For instance, McArthur et al. (2021) showed that screen time increased by an hour a week (from 10 to 11 hours) for children ages 5 to 8, but doubled for children ages 8 to 9 (from 12 to 24 hours). These levels of screen time stand in stark contrast with Canadian guidelines for children's screen time, which range from 0-2 hours of screen time a day, increasing with age.[16-17] Research in Germany revealed that, while children spent more time playing outside once pandemic restrictions eased,

they engaged more in indoor and creative activities at the outset of the pandemic.[18] It is not clear whether these changes in leisure activities were primarily driven by changes in schooling—such as the closure of in-person learning—or due to the variety of other changes in routine brought on by the pandemic.

The Pandemic and Literacy

The elementary school years are an important time in reading development, as children transition from "learning to read" to "reading to learn" around grades 3 to 4.[19] The early stage of reading is heavily dependent on the ability to decode printed text.[19] As children progress, reading strategies evolve with an emphasis on techniques that support reading comprehension.[20]

Reading Modality

As technology becomes increasingly incorporated into our society, coinciding with the pandemic shift to mandatory homeschooling which was often delivered online, it is of interest whether the pandemic resulted in a change in the modalities that children are using to read for pleasure. Research has begun to investigate this question. Read et al. (2021) surveyed parents with young children, ages 2-5, and asked them to self-report retrospectively on their literacy practices with their children before (February 2020) and during (October 2020) the pandemic lockdowns. The researchers examined factors such as reading frequency, the number of people that read with the child, and whether reading took place on paper or on a screen. While there was no significant change in reading frequency pre-and-during pandemic, parents reported a significant increase in reading on a screen, and a decrease in the number of people who read with the child.

Reading Strategy Use

Reading strategies are important tools in children's reading comprehension. These strategies are often used during shared book reading, which has been shown to benefit various elements of children's reading development.[21-23]

Given the variation in the amount of online learning during the pandemic, it is of interest whether children's use of reading strategies, as well as the medium they use (i.e., paper or screen), changed during this time period. Past research and practical guidelines have focused on which reading strategies are most effective for school-aged children to improve their word decoding, text comprehension, and connect ideas in the text to past knowledge. McKeown et al. (2009) examined various paper reading comprehension strategies used by teachers with their students in Grade 5, and found higher comprehension scores when reading strategies focused on text meaning (i.e., summarizing main ideas and asking questions during reading). Furthermore, the Institute of Education Sciences also recommends that educators ask content-related questions to test children's comprehension of text and encourage inference-related questions that go beyond literal understanding (i.e. asking a child *how* or why they know the answer to a content-related question).[20] For younger children, common paper reading strategies include sounding out words and asking questions about word meanings[25], whereas for older children, strategies such as recapping the contents of a text and checking comprehension are more effective.[25]

While research supports various reading strategies on paper, less is known about children's use of similar and different strategies while reading on a screen. Although reading strategies can be implemented while reading both on paper and on a screen, certain features that are unique to online reading (i.e., hyperlinks and easy access to word definitions) could alter how reading strategies are applied. These digital tools could either supplement or replace traditional strategies (i.e., online word definitions in lieu of inferring word meanings from context). Research has indicated that while certain reading strategies suggested for paper reading (i.e., checking understanding of the text and connection to prior knowledge) may be used while reading on a screen, the digital environment may require the use of other strategies such as navigating digital features and judging the reliability of a reading source.[26-28]

Research has begun to examine the home literacy practices of children and students of a variety of ages during the pandemic.[29-30] One comprehensive study compared the home literacy and home reading practices of families in Israel, Spain, and Bulgaria, comparing the timepoints of spring 2020, at the onset of the pandemic, to spring 2021.[9] The researchers examined three categories of home literacy activities including "shared book reading" (a variable we examined in the current study), as well as children's independent screen time. Findings showed that children spent more time on screens independently at the first timepoint, whereas parents engaged in more shared book reading with their children at the second timepoint. This research suggests that as the pandemic progressed, parents may have adapted to the novel circumstances, allowing for increased engagement in shared reading activities over time.

Examining reading and writing strategies, López-Escribano et al. (2021) surveyed parents with children between the ages of 2 to 9 years old by asking them to report on the period of April and May 2020, a time of mandated confinement and school closures in Spain. Using a latent class cluster analysis, the researchers classified families into four subgroups based on the reading and writing strategies used during lockdown: (1) Prioritizes writing activities (i.e., focused on school-based tasks such as name writing, copying letters and words; 52.5% of families), (2) Interested in practicing all types of literacy activities (i.e., interested in writing activities, dialogic-creative activities, reading activities, and digital literacy activities; 18.9% of families), (3) Willing to do digital activities (i.e., watching/listening to e-books, playing digital reading games; 15.1% of families), and (4) Ready to practice dialogic-creative activities (i.e., playing using letters, using

interactive dialogue about a text; 13.6% of families). The largest group, those prioritizing writing activities, participated less in digital activities and primarily centered literacy practices around school-related tasks. Additionally, older children were most represented in the "willing to do digital activities" cluster.[31]

Because of the importance of reading strategies in aiding with reading comprehension, and the evidence for pandemic-related learning losses, examining reading strategy use across schooling groups is of great interest. It is suspected that because of the pandemic and the shift to online learning, both reading on a screen and the use of digital reading strategies may have increased.[9-10] At the same time, paper strategies may have remained prevalent among families during the pandemic.[31] When comparing co-occurring schooling pandemic learning conditions, mandated homeschoolers may have utilized reading strategies more frequently than the other schooling groups, because their learning situation closely resembled pandemic lockdowns studied in the above research.

The Present Study

The objective of this study is to explore how changes in education brought on by the COVID-19 pandemic may have influenced how children are spending their time, including changes in reading formats (from paper to digital) and how reading strategies are being used, particularly whether these patterns are influenced by age and access to internet. Existing literature has shown an increase in digital reading when considering pre-pandemic and during-pandemic time periods.[9-10] In terms of reading and other literacy strategies, some studies have shown that during the pandemic, parents engaged in more writing-dominant activities (e.g., did more writing activities with their children than other types of literacy activities) compared to reading, digital, and dialogic-creative strategies.[31] This study will expand on existing literature by examining differences in digital and print reading strategies, as well as leisure activities, among children learning in one of three schooling conditions: **(1)** mandated homeschoolers (i.e., being schooled at home because of the COVID-19 pandemic), **(2)** voluntary homeschoolers (i.e., being schooled at home for reasons unrelated to the COVID-19 pandemic), and **(3)** in-person learners (i.e., those who were able to attend in-person classes during the COVID-19 pandemic). To analyze the potential impacts of age on reading strategies, leisure activities, and reading, participants were sorted into two groups based on age: younger children (ages 5-7), and older children (ages 8-12). These groups were decided based on the shift seen in reading development around ages 7 or 8.[19] To our knowledge, no research has examined the effect of the above variables on the frequency and type of print and digital reading strategies within the context of the COVID-19 pandemic.

The two central research questions of the current study are **(1)** Did children spend their leisure time differently during the pandemic based on their schooling group and age, including their screen versus paper reading for pleasure? And **(2)** Did families implement different reading strategies, and at different frequencies, with their children based on their school group and age?

Based on the existing literature, it is hypothesized that **(H1a)** mandated homeschoolers will engage in increased screen-based leisure activities, including reading for pleasure on a screen, compared to voluntary homeschoolers and in-person schoolers. However, no significant differences are expected between voluntary homeschoolers and in-person learners.[9,15,10] We expect no differences in paper reading for pleasure across the three groups.[32,10] It is also hypothesized that **(H1b)** older children will spend more time reading for pleasure across paper and digital modalities as compared to younger children, as they may be able to read independently due to their advanced reading skills.[19,31] **(H1c)** does not suggest a direction towards how children are spending their leisure time in the pandemic based on age, due to the lack of existing research examining these specific variables.

Regarding the second research question, it is hypothesized that **(H2a)** mandatory homeschoolers will employ more digital and paper reading strategies compared to voluntary homeschoolers and in-person learners.[31,10] **(H2b)** is that reading strategy type will not differ among the three groups.[9,31,10] However, it is expected that strategy type and frequency will vary by age, with parents employing reading strategies more frequently with older children compared to younger children.[9,25]

METHODS

Participants and Recruitment

In this study, we surveyed 961 couples (average ages in years: 39.13 (SD = 6.70) for in-person learners; 38.70 (SD = 9.61) for mandated homeschoolers; 36.17 (SD = 5.61) for voluntary homeschoolers) with children in Grades 1-5 and asked them to report on their youngest child's amount of time spent reading, as well as their use of reading strategies for both paper and digital reading. Participants were recruited through Qualtrics Survey Panels, an online survey platform. Although couples were recruited, only one partner answered the questions pertaining to schooling, leisure activities, and reading strategies. The study was approved by the Research Ethics Board at Dalhousie University, REB# 2020-5336. Participation in this survey was completely voluntary, and participants were anonymous. Initial recruitment through Qualtrics resulted in 764 initial couples. To increase representation of voluntary homeschoolers in the sample, homeschooling families were additionally recruited via social media and homeschooling groups, which increased the number of voluntary homeschooling couples by 198 couples.

To take part in the survey, participants were required to be 19 years of age or older, have both partners in the couple willing to respond to the survey, be in their romantic relationship for

at least three months, have been living together during January 15th-February 15th 2021, and have at least one child in Grades 1-5. These questions were asked as part of a larger questionnaire designed by the research team to evaluate families' well-being, and their experience engaging in homeschooling, during the COVID-19 pandemic. Participants were asked to reflect on the period from January 15th, 2021, to February 15th, 2021—a period unique to the studied region because of co-occurring mandated homeschooling and in-person schooling.[33] The participants were categorized into one of three schooling groups: in-person learners (n = 385), mandated homeschoolers (n = 332), voluntary homeschoolers (n = 244). The sample included individuals who were located in Canada (n = 800) and the United States of America (n = 154). The average age of child participants in years was 8.64 (SD = 2.75) for in-person learners, 8.80 (SD = 2.86) for mandated homeschoolers, and 8.44 (SD = 2.03) for voluntary homeschoolers. The participants were part of a larger study that examined how romantic couples functioned during the COVID-19 pandemic.

Measures

Demographic Questionnaire

The first part of the survey asked parents to answer demographic questions such as: location of residence, gender and sex, relationship type (i.e., opposite gender, same gender), ethnicity, education level, family income, and employment. The next section asked about their child's demographic information such as: age, gender, ethnicity, diagnosed disability, and enjoyment of schooling.

Table 1. *Parent demographic information.*

Adult Variable	**In-Person Learners (n = 772)**	**Mandated Homeschoolers (n = 664)**	**Voluntary Homeschoolers (n = 488)**
Adult Age - *M(SD)*	39.13 (6.70)	38.70 (6.91)	36.17 (5.61)
Number of Children – *M(SD)*	2.1 (.85)	1.97 (.85)	1.48 (.88)
Adult Gender			
Male	388	334	242
Female	383	328	244
Non-binary	1	2	0
Prefer not to answer	0	0	2
Family Income			
$25,000 or less per year	36	33	8
Between $26,00 and $50,000	78	76	83
Between $51,00 and $75,000	98	110	160
Between $76,00 and $100,000	172	106	122
Between $101,00 and $125,000	110	84	60
Between $126,00 and $150,000	117	94	38
$151,000 or more per year	128	132	10
Prefer not to answer	33	29	7
Highest Level of Education			
Elementary school	0	0	0
Some high school	17	15	10
High school graduate	81	74	44
Some college/university	88	67	130
College/university graduate	414	301	214
Some post-graduate	41	34	57
Post-graduate degree (e.g., Master's, Ph.D., LLB, MD)	131	173	33
Adult Ethnicity			
White	552	438	416
South Asian /Southeast Asian /East Asian (e.g., Chinese, Japanese, Korean)	116	117	21
Latin American	19	25	12
Black	28	19	1
First Nations	5	16	24
Arab / West Asian (e.g., Armenian, Egyptian, Iranian, Lebanese, Moroccan)	15	9	2
Multiracial	25	28	6
Other	9	7	2

Table 2. *Child demographic information.*

Child Variable	In-Person Learners (*n* = 385)	Mandated Homeschoolers (*n* = 332)	Voluntary Homeschoolers (*n* = 224)
Average Child Age – *M(SD)*	8.64 (2.75)	8.80(2.86)	8.44(2.03)
Country/Province of Residence			
Canadian	360	281	159
British Columbia	38	15	14
Alberta	72	25	15
Saskatchewan	14	5	4
Manitoba	20	8	4
Ontario	105	200	70
Quebec	67	21	14
New Brunswick	14	3	6
Prince Edward Island	2	0	0
Nova Scotia	19	1	32
Newfoundland and Labrador	6	3	0
Northwest Territories	1	0	0
Other (Canada)	2	0	0
American	22	49	83
Missing	3	2	2
Child Gender			
Female	183	150	76
Male	201	182	168
Non-binary	1	0	0
Prefer not to answer	1	0	0
Child Ethnicity			
White	267	212	203
South Asian/Southeast Asian/East Asian (e.g., Chinese, Japanese, Korean)	48	54	9
Latin American	7	7	3
Black	14	9	1
Indigenous	2	7	2
Arab/West Asian (e.g., Armenian, Egyptian, Iranian, Lebanese, Moroccan)	6	3	1
Multiracial	33	32	21
Other	9	8	4
Child Disability Diagnosis			
Yes	47	41	20
No	338	290	222
Prefer not to answer	1	1	2

Pandemic Schooling Questionnaire

Panelist A (the member of the couple who responded to the items about schooling, reading, and leisure activities) was then asked to complete a battery of questions regarding homeschooling and other leisure activities during the pandemic, referring to their youngest child in Grades 1-5, and regarding the period of January 15th-February 15th, 2021. Participants were asked to report the number of hours per week (from 0-60) attending school, being homeschooled by their parent (i.e., the panelist was asked about how many hours they spent homeschooling their child), learning at home, and engaging in specific leisure activities including being physically active, watching television, Netflix, movies, or YouTube, and playing video, computer, or app games. Information regarding the type of schooling (i.e., in-person; online; a mix of in-person and online; voluntary homeschooling) and the type of mandated homeschooling delivery by the school (i.e., live classes, pre-recorded classes, home learning packs) was also gathered. To examine reading behaviours, questions regarding the child's frequency of reading were assessed via number of hours spent per week reading for pleasure on both paper and screen modalities (0-60 hours/week). To assess internet access, participants were asked "To what extent did your child have access to a reliable internet connection?", referencing the studied period of January 15th-February 15th, 2021, which was assessed using a 7-point Likert scale. Participants were also asked how frequently they used four specific reading strategies with their children: sounding out words, discussing prior knowledge of the topic, checking in on understanding, and encouraging recapping. To select the four reading strategies included in the present study, published reports and guidelines on reading strategies were analyzed by the research team. The strategies of sounding out words, discussing prior knowledge of the topic, checking in on understanding, and encouraging recapping were the four most commonly recommended strategies across the guidelines analyzed. Strategy use was assessed for both paper reading and screen reading using a 7-point Likert scale, with *0 = never* and *6 = always*.

Data Analysis

Leisure activity was analysed using a Multivariable Analyses of Variance, MANOVA, so that both the child's schooling condition and the child's ages could be considered as independent variables, with age being categorized into two groups: early elementary, 5-7 years old, and middle elementary, 8-12 years old. Reading strategies were analysed using Mixed MANOVA, to examine the effect of reading modality and reading strategy type, while still looking at age and schooling condition as independent variables. All analyses were run in IMB SPSS Statistics, version 27.

RESULTS

Leisure Activities

Tables 3 and 4 summarize the descriptive statistics for all measures. There were between 0 and 10 extreme outliers within the leisure activities data ($z < \pm 3.29$)[34] and very few missing values (less than 1%). Overall, skewness and kurtosis values fell within the acceptable range (i.e., statistic ± 3.29)[34] for all 10 dependent variables. The overall dependent variable of time spent on leisure activities was analyzed using a 3 (schooling group: mandated, voluntary, in-person) X 2 [age: early elementary (5-7 years old), middle elementary (8-12 years old)] between-subjects multiple analysis of variance, MANOVA.

This analysis revealed a significant main effect of schooling group (Wilks $\lambda = .492$, $F = 40.25$, $p = .000$, $\eta^2 = .299$). Post-hoc testing indicated a statistically significant effect of schooling group on all dependent variables related to time spent on leisure activities (*p's <.05*), except for hours per week watching video entertainment ($p = .626$) (Table 7). As seen in Table 3, voluntary homeschoolers spent the most time learning at home not on a screen, interacting with friends or family on a screen, playing video, computer, or app games, being physically active, reading for pleasure on paper, and reading for pleasure on a screen relative to mandated homeschoolers and voluntary homeschoolers, with no difference between mandated homeschoolers and in-person learners. Voluntary homeschoolers also spent the most time interacting with friends and family in-person relative to mandated homeschoolers and in-person schoolers, with in-person schoolers spending more time on this activity than mandated homeschoolers. Both voluntary homeschoolers and mandated homeschoolers spent more time per week learning at home on a screen compared to in-person learners, with no difference between voluntary homeschoolers and mandated homeschoolers. In-person learners spent the most time per week attending school in person relative to voluntary homeschoolers and mandated homeschoolers, with voluntary homeschoolers spending more time attending school in-person than mandated homeschoolers.

A significant main effect of age was also found (Wilks $\lambda = .976$, $F = 2.347$, $p = .010$, $\eta^2 = .024$). Post-hoc testing revealed a significant effect of age on hours/week learning at home on a screen ($p = .029$) (Table 7). It was found that older children spent more hours per week learning on a screen compared to younger children. There was also a trend towards a significant difference for the main effect of age and time spent being physically active (Table 7), with younger children spending more hours per week being physically active compared to older children (Table 4). The analysis revealed a non-significant main effect for age and attending school in-person, learning at home on a screen, interacting with family and friends in-person, interacting with family and friends on a screen, watching video entertainment, playing video, computer, or app games, reading for pleasure on paper and reading for pleasure on a screen (p's > .05) (Table 7).

Table 4. *Means of leisure activities based on age (younger = ages 5-7 years; older = ages 8-12 years).*

Variable (hours/week)	**Younger** ***M(SD)***	**Older** ***M(SD)***
Attending school in-person	21.11 (16.88)	20.75 (16.21)
Learning at home (screen)	16.25 (15.32)	18.75 (15.74)
Learning at home (not screen)	12.67 (12.97)	13.34 (13.74)
Socializing (in-person)	11.48 (13.34)	11.31 (13.93)
Socializing (screen)	11.96 (14.07)	13.13 (14.04)
Watching video entertainment	18.48 (13.88)	18.83 (14.58)
Playing online games	13.94 (14.04)	15.52 (14.46)
Being physically active	18.41 (14.29)	16.40 (14.51)
Reading for pleasure on paper	11.97 (12.94)	12.69 (14.47)
Reading for pleasure on a screen	10.98 (13.58)	11.27 (14.11)

Table 3. *Means of leisure activity based on schooling group and both schooling group and age (younger = ages 5-7 years; older = ages 8-12 years).*

Variable (hours/week)	**In-Person Learners** *M(SD)*			**Mandated Homeschoolers** *M(SD)*			**Voluntary Homeschoolers** *M(SD)*		
	Younger	Older	Total	Younger	Older	Total	Younger	Older	Total
Attending school in-person	31.63 (13.32)	32.20 (11.22)	31.94 (12.20)	11.30 (15.34)	10.59 (14.75)	10.88 (15.00)	15.24 (13.25)	18.13 (13.89)	17.11 (13.71)
Learning at home (screen)	10.24 (14.59)	9.00 (14.04)	9.56 (14.29)	22.00 (15.21)	25.52 (13.64)	24.07 (14.38)	19.45 (12.37)	23.35 (13.73)	22.00 (13.38)
Learning at home (not screen)	9.79 (13.97)	9.00 (12.91)	9.33 (13.39)	11.93 (10.10)	12.75 (11.81)	12.42 (11.14)	19.67 (12.41)	19.92 (14.59)	19.84 (13.84)
Socializing (in-person)	12.27 (14.50)	9.82 (13.22)	10.92 (13.85)	8.00 (11.83)	8.45 (13.47)	8.25 (12.81)	15.38 (11.82)	16.87 (13.93)	16.35 (13.22)
Socializing (screen)	11.07 (14.43)	10.56 (13.55)	10.79 (13.94)	9.38 (12.75)	12.02 (13.33)	10.94 (13.14)	17.81 (13.82)	17.95 (14.41)	17.90 (14.18)
Watching video entertainment	18.50 (15.39)	17.89 (15.09)	18.17 (15.21)	17.77 (12.57)	19.57 (14.55)	18.84 (13.79)	19.56 (12.65)	19.16 (13.91)	19.30 (13.46)
Playing online games	13.44 (15.19)	13.12 (13.78)	13.28 (14.14)	12.51 (12.12)	15.85 (14.49)	14.49 (13.66)	17.22 (14.07)	18.27 (14.86)	17.90 (14.56)
Being physically active	19.51 (14.97)	15.58 (14.23)	17.36 (14.68)	15.73 (13.18)	14.22 (14.64)	14.84 (14.06)	20.40 (14.08)	20.20 (14.07)	20.27 (14.05)
Reading for pleasure on paper	11.86 (14.30)	10.89 (13.84)	11.33 (14.04)	9.59 (10.88)	10.62 (14.25)	10.20 (12.98)	15.95 (12.21)	17.66 (14.45)	17.06 (13.70)
Reading for pleasure on a screen	9.95 (14.74)	7.90 (13.17)	8.82 (13.92)	8.51 (10.99)	9.90 (13.63)	9.34 (12.63)	17.00 (13.21)	17.47 (14.02)	17.29 (13.71)

Reading Strategies

Tables 5 and 6 summarize the descriptive statistics for all measures. To ensure the data was normal, normality tests were conducted on the raw scores of the dependent variable. There were between 0 and 8 extreme outliers within the reading strategies data ($z < \pm 3.29$)[34], and very few missing values (less than 1%). Overall, skewness and kurtosis values fell within the acceptable range (i.e., statistic ± 3.29)[34] for all 8 dependent variables. Mauchly's test of sphericity was significant for the within-subjects effect of strategy ($p < .001$), but was not significant for the within-subjects effect of modality ($p > .05$), and the modality and strategy interaction ($p = .169$). The assumption of sphericity was therefore satisfied for the individual factor of modality, and the interaction of modality and strategy, but not for the individual factor of strategy. This research question was analyzed using a Mixed MANOVA, with schooling group and age as the between-subjects factors and reading strategy type and modality as the within-subjects factors.

This analysis revealed a significant main effect of strategy modality (Wilks $\lambda = .947$, F = 53.46, p = .000, $\eta^2 = .053$), and strategy type (Wilks $\lambda = .966$, F = 11.27, p = .000, $\eta^2 = .034$).

A significant multivariate interaction effect was found between strategy modality and schooling group (Wilks $\lambda = .977$, $F(2,955) = 11.27$, $p < .001$, $\eta^2 = .02$). Bonferroni pairwise comparisons revealed that when comparing the use of reading strategies between paper and screen modalities, it was found that both mandated homeschoolers and in-person learners employed reading strategies while reading on paper more frequently than while reading on a screen (Table 8). No difference was found between modalities for voluntary homeschoolers. Follow-up Mixed MANOVAs concluded that, for the paper modality, both in-person learners and mandated homeschoolers used reading strategies significantly more than voluntary homeschoolers, with no difference between in-person learners and mandated homeschoolers. When looking at the screen modality,

mandated homeschoolers employed digital reading strategies significantly more than both in-person learners and voluntary homeschoolers (Table 8). No difference was found between in-person learners and voluntary homeschoolers for the digital modality.

Regarding strategy type, a significant three-way interaction effect was found between strategy type, schooling group, and age (Wilks $\lambda = .995$, $F(6,2865) = 5.36$, $p < .001$, $\eta^2 = .01$). Follow-up Mixed MANOVAs revealed that, when looking at in-person learners, all four reading strategies were employed significantly more with younger children as compared to older children (Table 9). Mandated homeschoolers showed a significant difference based on age and strategy type only for the strategy of sounding out while reading, which was employed more often with younger children (Table 9). And, voluntary homeschoolers showed a significant difference based on age and strategy type for the strategy of recapping what's been read, employing this strategy more often with younger children (Table 9). When comparing schooling groups, a significant difference was found between in-person learners and voluntary homeschoolers within the younger age group, such that in-person learners engaged with all strategies more often with younger children than voluntary homeschoolers. A significant difference was also found between mandated homeschoolers and voluntary homeschoolers for both age groups. Mandated homeschoolers engaged in all reading strategies more frequently than voluntary homeschoolers, with both older and younger children. No significant difference based on age and strategy type was found between mandated homeschoolers and in-person learners.

Table 7. *Summary of MANOVA results for leisure activities based on schooling group, age, and both.*

Variable (hours/week)	MANOVA Factor	*F*-value	df	*p*-value	Partial Eta Squared
Attending school in-person	Schooling Group	221.61	2,960	<.001	.32
	Age	1.00	1,960	.317	.00
	Schooling Group and Age	1.16	2,960	.315	.00
Learning at home on a screen	Schooling Group	100.32	2,960	<.001	.17
	Age	4.79	1,960	.029	.01
	Schooling Group and Age	3.47	2,960	.031	.01
Learning at home not on a screen	Schooling Group	47.20	2,960	<.001	.09
	Age	0.01	1,960	.928	.00
	Schooling Group and Age	0.38	2,960	.682	.00
Interacting with friends/family in-person	Schooling Group	23.30	2,960	<.001	.05
	Age	0.03	1,960	.856	.00
	Schooling Group and Age	1.86	2,960	.156	.00
Interacting with friends/family on a screen	Schooling Group	22.74	2,960	<.001	.05
	Age	0.66	1,960	.417	.00
	Schooling Group and Age	1.22	2,960	.296	.00
Watching TV, Netflix, movies, YouTube	Schooling Group	0.47	2,960	.626	.00
	Age	0.08	1,960	.782	.00
	Schooling Group and Age	0.70	2,960	.497	.00
Playing video, computer, app games	Schooling Group	7.24	2,960	<.001	.02
	Age	2.04	1,960	.154	.00
	Schooling Group and Age	1.44	2,960	.238	.00
Being physically active	Schooling Group	9.20	2,960	<.001	.02
	Age	3.81	1,960	.051	.00
	Schooling Group and Age	1.34	2,960	.263	.00
Reading for pleasure on paper	Schooling Group	17.27	2,960	<.001	.04
	Age	0.41	1,960	.521	.00
	Schooling Group and Age	0.82	2,960	.440	.00
Reading for pleasure on a screen	Schooling Group	31.24	2,960	<.001	.06
	Age	0.00	1,960	.957	.00
	Schooling Group and Age	1.55	2,960	.213	.00

Table 5. *Means of reading strategies based on schooling group and both schooling group and age (younger = ages 5-7 years; older = ages 8-12 years).*

Variable	Modality	In-Person Learners *M(SD)*			Mandated Homeschoolers *M(SD)*			Voluntary Homeschoolers *M(SD)*		
		Younger	Older	Total	Younger	Older	Total	Younger	Older	Total
Sound out	Paper	4.71 (1.18)	3.95 (1.66)	4.29 (1.51)	4.48 (1.17)	3.96 (1.51)	4.17 (1.41)	3.64 (1.28)	3.77 (1.08)	3.72 (1.16)
	Screen	4.28 (1.47)	3.53 (1.85)	3.87 (1.73)	4.12 (1.36)	3.82 (1.51)	3.94 (1.46)	3.64 (1.41)	3.73 (1.20)	3.70 (1.28)
Discuss prior knowledge	Paper	4.33 (1.14)	3.85 (1.24)	4.07 (1.21)	4.11 (1.12)	4.06 (1.19)	4.08 (1.16)	3.71 (1.16)	3.59 (1.24)	3.63 (1.21)
	Screen	4.11 (1.30)	3.41 (1.61)	3.73 (1.52)	3.87 (1.29)	3.88 (1.29)	3.88 (1.29)	3.59 (1.10)	3.64 (1.12)	3.62 (1.11)
Check understanding	Paper	4.40 (1.19)	3.98 (1.37)	4.17 (1.31)	4.28 (1.08)	4.19 (1.25)	4.23 (1.18)	3.92 (1.21)	3.80 (1.18)	3.84 (1.19)
	Screen	4.10 (1.35)	3.48 (1.63)	3.76 (1.54)	4.00 (1.23)	3.97 (1.34)	3.98 (1.30)	3.92 (1.21)	3.81 (1.24)	3.85 (1.23)
Recap what they've read	Paper	4.22 (1.25)	3.91 (1.41)	4.05 (1.35)	4.19 (1.18)	4.17 (1.27)	4.18 (1.23)	4.09 (1.14)	3.78 (1.19)	3.89 (1.18)
	Screen	4.09 (1.35)	3.50 (1.67)	3.77 (1.56)	4.01 (1.29)	3.98 (1.39)	4.00 (1.35)	4.02 (1.27)	3.72 (1.17)	3.82 (1.22)
Average	Paper	4.42 (1.02)	3.93 (1.24)	4.15 (1.17)	4.27 (0.93)	4.10 (1.11)	4.16 (1.04)	3.84 (0.91)	3.73 (0.89)	3.77 (0.90)
	Screen	4.15 (1.22)	3.50 (1.56)	3.78 (1.45)	4.00 (1.14)	3.91 (1.23)	3.95 (1.20)	3.79 (0.98)	3.72 (0.91)	3.75 (0.93)

Table 6. *Means of reading strategies based on age (younger = ages 5-7 years; older = ages 8-12 years).*

Variable	Modality	Younger *M(SD)*	Older *M(SD)*
Sound out	Paper	4.40 (1.27)	3.90 (1.27)
	Screen	4.09 (1.44)	3.69 (1.57)
Discuss prior knowledge	Paper	4.12 (1.16)	3.85 (1.23)
	Screen	3.92 (1.27)	3.64 (1.39)
Check understanding	Paper	4.26 (1.17)	4.00 (1.28)
	Screen	4.03 (1.28)	3.74 (1.44)
Recap what they've read	Paper	4.18 (1.20)	3.97 (1.31)
	Screen	4.05 (1.31)	3.73 (1.46)
Average	Paper	4.24 (0.99)	3.93 (1.11)
	Screen	4.02 (1.15)	3.70 (1.30)

Table 8. *Estimated marginal means for reading strategy modality by schooling group.*

Schooling Group	Modality	Mean	Standard Error	Lower Bound (95% CI)	Upper Bound (95% CI)
In-Person Learners	Paper	4.15	.05	4.04	4.25
	Screen	3.78	.06	3.66	3.91
Mandated Homeschoolers	Paper	4.17	.06	4.05	4.28
	Screen	3.95	.07	3.81	4.08
Voluntary Homeschoolers	Paper	3.77	.07	3.64	3.91
	Screen	3.75	.08	3.59	3.91

Table 9. *Estimated marginal means for reading strategy type by schooling group and age (younger = ages 5-7 years; older = ages 8-12 years).*

Strategy	Schooling Group	Age	Mean	Standard Error	Lower Bound (95% CI)	Upper Bound (95% CI)
Sound out	In-person Learners	Younger	4.49	.10	4.30	4.69
		Older	3.74	.09	3.56	3.92
	Mandated Homeschoolers	Younger	4.30	.11	4.08	4.52
		Older	3.89	.09	3.72	4.06
	Voluntary Homeschoolers	Younger	3.64	.14	3.36	3.92
		Older	3.75	.11	3.54	3.96
Discuss prior knowledge	In-person Learners	Younger	4.22	.09	4.06	4.39
		Older	3.63	.08	3.48	3.78
	Mandated Homeschoolers	Younger	3.99	.10	3.80	4.18
		Older	3.97	.08	3.82	4.12
	Voluntary Homeschoolers	Younger	3.65	.12	3.41	3.89
		Older	3.61	.09	3.44	3.79
Check understanding	In-person Learners	Younger	4.25	.09	4.08	4.43
		Older	3.73	.08	3.57	3.89
	Mandated Homeschoolers	Younger	4.14	.10	3.96	4.33
		Older	4.08	.08	3.93	4.23
	Voluntary Homeschoolers	Younger	3.92	.13	3.67	4.17
		Older	3.81	.09	3.62	3.99
Recap what they've read	In-person Learners	Younger	4.16	.09	3.98	4.34
		Older	3.71	.08	3.54	3.87
	Mandated Homeschoolers	Younger	4.10	.10	3.90	4.30
		Older	4.08	.08	3.92	4.24
	Voluntary Homeschoolers	Younger	4.06	.13	3.80	4.32
		Older	3.75	.10	3.56	3.94

DISCUSSION

The present study aimed to examine the behaviours and reading practices of children learning in various settings because of pandemic-related containment measures that were implemented in early 2021. More specifically, leisure activities, reading on paper and on a screen, and the reading strategies used in both formats across three co-occurring schooling conditions: mandated homeschooling, in-person learning, and voluntary homeschooling. It was hypothesized that children in mandated homeschooling would engage in the most digital reading and utilize digital reading strategies most frequently.

Leisure Activity Findings

Contrary to our hypotheses, voluntary homeschoolers spent significantly more time per week reading on a screen and on paper than both mandated homeschoolers and in-person learners **(H1a)**. This finding contrasts with previous research indicating an increase in digital reading during pandemic-related restrictions.[10] While we predicted that those required to learn from home due to pandemic restrictions would follow a similar trend, it was instead voluntary homeschoolers, those who learned from home for reasons unrelated to the pandemic, who spent the most time reading at home.

Regarding other screen-based activities, voluntary homeschoolers spent significantly more time on almost all other screen-based activities (i.e., interacting with friends or family on a screen; playing video, computer, or app games), inconsistent with both our hypothesis **(H1a)** and prior research showing increased time spent on a screen during pandemic-related lockdowns.[9,15,8] One potential explanation is the flexibility in voluntary homeschoolers —less rigid learning schedules could make it easier to spend time on other leisure activities. For (**H1b)**, we hypothesized that older children would spend more time reading for pleasure both on a screen and on paper—and no significant differences were found here. This result contrasts previous research supporting the development of reading skills with age[19], by which we hypothesized that reading for pleasure would also increase with age. This discrepancy could stem from the wording of our survey question, which asked about reading for pleasure but did not differentiate between reading as part of educational activities and reading during free time. Future research could better analyze reading practices by asking about shared and independent reading as an educational activity, and shared and independent reading in a child's free time. Regarding **(H1c)**, significant age-related differences were only found for time spent learning on a screen, with older children engaging in this activity more than younger children. This finding is consistent with McArthur et al. (2021)'s study, which showed that screen time increases with age. It is also possible that older children had more online learning requirements from school (i.e., live classes, online assessments), which may explain this difference.

Reading Strategy Findings

Regarding reading strategies **(H2a)**, we hypothesized that parents of mandated homeschoolers would employ digital reading strategies and paper reading strategies more frequently than both parents of voluntary homeschoolers and parents of in-person learners. Regarding strategy type **(H2b)**, it was hypothesized that the type of strategy implemented by parents would not significantly differ based on schooling groups.

When comparing the use of strategies across various reading modalities, it was found that mandated homeschoolers employed more reading strategies while reading on a screen compared to the other schooling groups. This is consistent with Read et al. (2021) who found that children spent more time reading on a screen after COVID-19 containment measures. Our hypothesis was based on the assumption that if mandated homeschoolers were engaging in more screen reading, they would also be using more reading strategies in this format—this prediction was supported. However, there was no difference between mandated homeschoolers and in-person learners when reading on paper—these two groups implement paper reading strategies at a comparable frequency, which contrasts **(H2a)**. This could potentially be explained by emphasis being put on paper reading strategies to parents from schools and school boards—an advantage that voluntary homeschoolers may not have access to. For example, in Nova Scotia, the provincial government provided mandated homeschooling families with structured literacy activities and reading strategy guidance to support home learning.[35] Additionally, a significant difference was found between in-person learners and voluntary homeschoolers, in that voluntary homeschoolers used strategies on paper less frequently than both other schooling groups.

Due to the limited research surrounding the types of reading strategies being used by families in the pandemic, no differences were hypothesized between the schooling groups. However, we did observe notable differences in how reading strategies were being used by parents based on their child's schooling group. In-person learners used all analyzed strategies differently between age groups—using all four strategies more frequently with younger children compared to older children. This might be because in-person learners receive more direct support from educators, leading parents to feel that their children are adequately supported. As children progress in their reading development, they may require less direct assistance.[19] The only strategy that mandated homeschoolers used differently based on age was sounding out words, using it more frequently with younger children. For the strategy of recapping what's been read, voluntary homeschoolers used this strategy more with younger children. This could suggest that voluntary homeschoolers, along with mandated homeschoolers, may be compensating for the lack of formal reading instruction by maintaining the use of strategies as their children grow older. Mandated homeschoolers may show differential use of sounding out words based on age, because this strategy may be more commonly known and therefore more accessible to mandated homeschoolers who might want to supplement their children's home learning. Research on voluntary homeschoolers is limited, especially when considering the vast number of reasons why a family may choose to homeschool their children. Future research could examine the types of curricula, reasons for homeschooling, and schooling schedules of homeschooling families, to better understand how the pandemic may have impacted their children's learning. When comparing the schooling groups more specifically, a significant difference was found between in-person learners and voluntary homeschoolers when comparing schooling group and age, such that in-person learners were more likely to use all four strategies with younger children than voluntary homeschoolers (with no differences for older children). Moreover, when comparing mandated homeschoolers and voluntary homeschoolers, mandated homeschoolers were more likely to use all strategies more frequently, with both younger and older children, than voluntary homeschoolers. These differences in strategy use based on age could be related to children's shift away from "learning to read" to "reading to learn" as children get older.[19] Parents may reduce their strategy use with children who have surpassed the "learning to read" stage, presuming that strategies are less needed to support children's

reading once they are in elementary school. We do therefore see a difference in how each homeschooling group uses reading strategies based on the specific strategy type.

Limitations and Future Directions

Limitations are present in the described study. First, the study design limited participant recruitment based on internet access. This study was disseminated via an online platform, and as such those with low internet access (who may have experienced these shifts towards digital learning differently) were likely not able to access the questionnaire as easily as those with higher internet access. Limited internet access may be a result of rural geographical location where strong internet connection is not available, or a result of the cost in accessing rapid internet service, meaning that due to the internet dissemination of the study, the sample of participants may not have represented all geographical settings and socioeconomic statuses appropriately. Future research might include purposeful sampling, and a telephone or paper option, to better represent those with low internet access. This research also relied on retrospective reporting on the period of January 15th-February 15th, 2021. While this was done intentionally, to examine a specific period of pandemic conditions in North America, participants' report may have been subject to memory bias. As well, the nature of self-report research means that participants may have altered their responses due to social desirability bias. The research is also limited in its generalizability, because of a sample that was predominantly White, and of a high socio-economic status. The sample was also only North American, which was intentional to examine the various pandemic restrictions that co-occurred at the beginning of 2021 in North America, but this does limit the generalizability of the research. Within the North American sample, certain provinces were more heavily represented than others, which is of note because different provinces had varying lengths of mandated homeschooling. For example, the most common Canadian province represented in our sample was Ontario, and this province had the longest mandated homeschooling of all Canadian provinces.[36] Students in different provinces and states may have been impacted differently by mandated homeschooling, based on how long this mandated homeschooling requirement was in place. Future research might aim to better represent individuals of diverse ethnicity and income level, and examine participants in different geographical areas, to better reflect the global differences in pandemic containment measures.

Implications of the Findings

Despite its limitations, this research offers a valuable perspective into the leisure and reading practices of families with elementary-aged children in North America during early 2021. This research is valuable first and foremost to parents, to be able to better understand how the changes in the lives of children during the COVID-19 pandemic may have impacted day-to-day living. The findings about reading practices and reading strategies can help parents more specifically, to examine their own reading practices with their children. It was found that generally, reading strategies were used the most with younger children who were mandated homeschoolers during the studied period. This discrepancy in strategy use is important especially when considering that reading at this elementary school stage of life is critical.[19] Furthermore, research has found that using reading strategies is beneficial to students' reading comprehension even in the older group studied in the present study[24], so this research might help support continuing strategy use with older children. The present research also holds significance for educators; knowing how children are learning and spending their time during mandated homeschooling specifically can help educators better accommodate students once they return to in-person learning, and better address educational gaps that may have come because of the pandemic.[37,38] Parents and educators alike can use these findings to analyse the practices they use when engaging children with reading, and to help mitigate any pandemic-related changes in reading behaviours.

CONCLUSION

The COVID-19 global pandemic has caused many changes in the lives of children. The significant change of learning from home, and its regional variations, are an area of considerable interest for current and future research, to help educators and parents better understand how pandemic-related changes may have impacted children. The present study has exposed variations in leisure activity and reading strategy use for families whose children are learning in-person, through mandated homeschooling, and through voluntary homeschoolers during the COVID-19 pandemic.

REFERENCES

1. Viner R, Russell S, Saulle R, et al. School closures during social lockdown and mental health, health behaviors, and well-being among children and adolescents during the first COVID-19 wave: A systematic review. *JAMA Pediatrics.* 2022;1(76):400-409. doi:10.1001/jamapediatrics.2021.5840
2. The Canadian Press. A timeline of COVID-19 in Canada. The Star. (2021, January 24). https://www.thestar.com/politics/2021/01/24/a-timeline-of-covid-19-in-canada.html
3. Coskun K, Kara C. Impact of school closure due to COVID-19 on phonemic awareness of first-grade primary school children. *Humanit Soc Sci Commun.* 2022;9(196). doi: 10.1057/s41599-022-01218-0
4. Domingue BW, Dell M, Lang D, et al. The Effect of COVID on Oral Reading Fluency During the 2020–2021 Academic Year. *AERA Open*. 2022;8. doi: 10.1177/23328584221120254
5. Lerkkanen MK, Pakarinen E, Salminen J, et al. Reading and math skills development among Finnish primary school children before and after COVID-19 school

closure. 2022; 36:263-288. doi: 10.1007/s11145-022-10358-3
6. Dunn K, Georgiou GK, Inoue T, et al. Home and school interventions aided at-risk students' literacy during Covid-19: A longitudinal analysis. *Reading and Writing.* 2023;36:449-466. doi: 10.1007/s11145-022-10354-7
7. Kartushina N, Mani N, Aktan-Erciyes, A, et al. COVID-19 first lockdown as a window into language acquisition: associations between caregiver-child activities and vocabulary gains. *Language Development Research.* 2022;2(1):1-36. doi:10.34842/abym-xv34
8. McArthur BA, Racine N, Browne D, et al. Recreational screen time before and during COVID-19 in school-aged children. *Acta Paediatrica*. 2022;110(10):2805-2807. doi: 10.1111/apa.15966
9. Meoded Karabanov G, Aram D, López-Escribano C, et al. The COVID-19 pandemic: Changes in parent-child activities at home from spring 2020 to spring 2021 from a cross-cultural view. *Education Sciences*. 2023;13(10):1013. doi: 10.3390/educsci13101013
10. Read K, Gaffney G, Chen A, et al. The impact of COVID-19 on families' home literacy practices with young children. *Early Childhood Education Journal*. 2022;50(8):1429-1438. doi: 10.1007/s10643-021-01270-6
11. Chamberlain L, Lacina J, Bintz W, et al. Literacy in lockdown: Learning and teaching during COVID-19 school closures. *The Reading Teacher*. 2020;74(3):243-253. doi: 10.1002/trtr.1961
12. Education and Early Childhood Development (2020, December 11). Holiday Break for Public Schools Extended. *Nova Scotia.* https://novascotia.ca/news/release/?id=20201211005
13. CBC News. All schools close in metro St. John's until Feb. 26 as COVID-19 outbreak swells. (2021, February 10). https://www.cbc.ca/news/canada/newfoundland-labrador/class-instruction-suspended-nlesd-1.5908958
14. Bergmann C, Dimitrova N, Alaslani K, et al. Young children's screen time during the first COVID-19 lockdown in 12 countries. *Sci Rep.* 2022;12(1):2015. doi: 10.1038/s41598-022-05840-5.
15. Pietrobelli A, Pecoraro L, Ferruzzi A, et al. Effects of COVID-19 lockdown on lifestyle in children with obesity living in Verona, Italy: A longitudinal study. *Obesity*. 2020;28(8):1382-1385. doi: 10.1002/oby.22861
16. The Canadian Society for Exercise Physiology. Canadian 24-hour movement guidelines: An integration of physical activity, sedentary behaviour, and sleep. (2021). https://csepguidelines.ca/guidelines/children-youth/
17. Government of Canada. Mind: Screen Time. (2019, February 27). https://www.canada.ca/en/public-health/services/publications/healthy-living/screen-time-nobodys-perfect.html
18. Poulain T, Meigen C, Sobek C, et al. Loss of childcare and classroom teaching during the Covid-19-related lockdown in spring 2020: A longitudinal study on consequences on leisure behavior and schoolwork at home. *PLoS ONE.* 2021;16(3). doi:10.1371/journal.pone.0247949
19. Chall JS. *Stages of reading development.* McGraw-Hill;1983.
20. Foorman B, Beyler N, Borradaile K, et al. Foundational skills to support reading for understanding in kindergarten through 3rd grade (NCEE 2016-4008). *National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education.* 2016. https://ies.ed.gov/ncee/wwc/Docs/PracticeGuide/wwc_foundationalreading_070516.pdf
21. Elley WB (1989). Vocabulary acquisition from listening to stories. *Reading Research Quarterly.* 1989;24(2):174–187. doi: 10.2307/747863
22. Bus AG, van Ijzendoorn MH, Pellegrini AD. Joint Book Reading Makes for Success in Learning to Read: A Meta-Analysis on Intergenerational Transmission of Literacy. *Review of Educational Research*. 1995;65(1):1–21. doi: 10.2307/1170476
23. Noble C, Cameron-Faulkner T, Jessop A, et al. The impact of interactive shared book reading on children's language skills: A randomized controlled trial. *Journal of Speech, Language and Hearing Research*. 2020;63(6):1878-1897. doi: 10.1044/2020_JSLHR-19-00288
24. McKeown MG, Beck IL, Blake RG. Rethinking reading comprehension instruction: A comparison of instruction for strategies and content approaches. *Reading Research Quarterly*. 2009;44(3):218-253. https://www.jstor.org/stable/25655454
25. Shanahan T. The national reading panel report: Practical advice for teachers. *North Central Regional Educational Laboratory (NCREL), Institute of Education Sciences, U.S. Department of Education.* 2005. https://files.eric.ed.gov/fulltext/ED489535.pdf
26. Coiro J, Dobler E. Exploring the online reading comprehension strategies used by sixth-grade skilled readers to search for and locate information on the Internet. *Reading Research Quarterly*. 2007;44(2):214-257. doi: 10.1598/RRQ.42.2.2
27. Park HR, Kim D. English language learners' strategies for reading computer-based texts at home and in school. *CALICO Journal*. 2016;33(3):380-409. doi: 10.1558/cj.v33i3.26552
28. Park HR, Kim D, Vorobel O. International students' reading digital text on tablets: Experiences and strategies. *Journal of Computing in Higher Education*. 2020;32:476-504. doi: 10.1007/s12528-019-09242-x
29. Hidayat M, Saleh MN. Students' reading strategies during the pandemic in higher education. *Nazhruna: Jurnal Pendidikan Islam*. 2022;5(3):1036-1046. doi: 10.31538/nzh.v5i3.2300

30. Stites ML, Sonneschein S, Galczyk, SH. Preschool parents' views of distance learning during COVID-19. *Early Education and Development.* 2021;32(7):923-939. doi: 10.1080/10409289.2021.1930936
31. López-Escribano C, Escudero A, Pérez-López R. An exploratory study about patterns of parental home literacy activities during the COVID-19 confinement among Spanish families. *Early Education and Development.* 2021;32(6):812-829. doi:10.1080/10409289.2021.1916184
32. Jack B. Pandemic reading: Poetry, looking and seeing. *The Lancet.* 2021;3297(10283):1438-1439. doi: 10.1016/S0140-6736(21)00831-X
33. The Canadian Press. Some schools to return to in-person learning as Ontario sees 2,655 new COVID-19 cases. Canadian Broadcasting Corporation. (2021, January 20). https://www.cbc.ca/news/canada/toronto/covid-19-ontario-january-20-2021-enforcement-blitz-1.5880208
34. Tabachnick BG, Fidell LS. (2007). *Using multivariate statistics*. 5th ed. Allyn and Bacon; 2007..
35. Nova Scotia. Nova Scotia At-Home Student Learning Packages. (2020, April 22). https://curriculum.novascotia.ca/sites/default/files/documents/resource-files/April%20%2021%20P%20to%209%20learning%20package.pdf
36. Gallagher-Mackay K, Srivastava P, Underwood K, et al. COVID-19 and education disruption in Ontario: Emerging evidence on impacts. *Law and Society Faculty Publications*. 2021;1. https://scholars.wlu.ca/laso_faculty/1
37. Green F. Schoolwork in lockdown: New evidence on the epidemic of educational poverty. *LLAKES Centre for Learning and Life Chances in Knowledge Economies and Societies.* (2020). https://www.llakes.ac.uk/wp-content/uploads/2021/03/RP-67-Francis-Green-Research-Paper-combined-file.pdf
38. Weber C, Helm C, Kemethofer D. Are social and ethnic reading inequalities increasing during school closures?—The mediating role of parental involvement in distance learning. *Frontiers in Education.* 2021;13. doi: 10.3389/feduc.2021.73706