Experiences and attitudes of elementary school students and their parents toward online learning in China during the COVID-19 pandemic: Questionnaire Study

Shu Cui, Chao Zhang, Shijiang Wang, Xingong Zhang, Lei Wang, Ling Zhang, Qiuyu Yuan, Cui Huang, Fangshuo Cheng, Kai Zhang, Xiaoqin Zhou

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Abstract

Background: Due to the widespread infection of COVID-19, an emergency homeschooling plan was rigorously implemented throughout China.

Objective: This study aimed to investigate the experiences and attitudes of elementary school students and their parents (two generations from the same family) towards online learning in China during the pandemic.

Methods: A 16-item questionnaire was distributed at the 10 day- and 30 day-mark after the first online course to 867 parent-child pairs and 141 parent-child pairs, respectively. The questionnaire comprised of questions pertaining to the course and homework's completeness, effectiveness, reliability, and abundance as well as the students' enthusiasm to take part in online classes and their satisfaction with the courses.

Results: According to the study, more than 91% of students exhibited high or moderate enthusiasm for participating in online classes. However, most students performed poorly in online learning classes and after-school homework. Regarding satisfaction, parents and students' average scores were 7.35 and 7.25, respectively (10-point scoring system). During the second stage of the study, parents' positive evaluations of online learning declined, including the effectiveness and reliability of the courses. Furthermore, the proportion of students who completed the courses and homework on time decreased; this difference proved statistically significant. The overall satisfaction of parents and students with online learning also declined during this second stage (7.21 vs. 7.23); however, the difference between the two stages was not statistically significant. Several of the parents, 36.2%, indicated that assisting and supervising the students' online learning caused increased stress. Thirty-six percent of parents expressed dissatisfaction or suggestions concerning online learning; most parents and students hoped to return to face-to-face classes (94.9% vs. 93.5%). Finally, six main issues that parents are most concerned are summarized: (1) disappointment regarding courses lack of timely interaction; (2) worry about students not understanding the course; (3) increased burden of annoying adult responsibilities; (4) worry about the children's eyesight; (5) worry about teachers' explanations were not detailed enough; (6) Worry about the decline of students' interest and attention.

Conclusions: Online learning could prevent the spread of infectious diseases while still allowing elementary school students to gain knowledge. However, children's completion of the courses and homework were not satisfactory. Furthermore, their parents often experienced stress and had many worries and complaints. Measures such as increasing the interactivity of the courses and prohibiting teachers from assigning task to parents could improve the effectiveness of these courses and mental health level of parents and students.

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Conclusions: Online learning could prevent the spread of infectious diseases while still allowing elementary school students to attain knowledge. However, children's completion of the courses and homework were not satisfactory. Furthermore, their parents often experienced stress and had many concerns and complaints. Measures such as increasing the interactivity of the courses and prohibiting teachers from assigning the task to parents could improve the effectiveness of these courses and the mental health level of parents and students.

Keywords: attitude; elementary school students; parents; online learning; COVID-19

Introduction

Due to the widespread infection of the coronavirus disease 2019 (COVID-19), the Chinese government postponed the opening of schools after the Spring Festival to prevent further infections [1]. Additionally, face-to-face socializing was prohibited as well. China's Ministry of Education estimated that more than 270 million students were confined to their homes, including 17.67 million elementary school students [2].

The Ministry of Education stipulated that even though schools were closed, teaching must continue during the lockdown period [3]. Accordingly, online teaching has been rigorously implemented in China [4]. Since mid-February 2020, schools, and teachers at all levels have made considerable efforts toward creating and delivering online courses, whether through the internet or over television (TV) broadcasts [5]. Consequently, this has led to the largest online learning campaign in human

history.

Previous research has shown that online education appears to have great potential in addressing the availability and efficiency of education [6,7]. However, by itself, it is not more effective than a classroom-based approach but depends on how well the instructional design is integrated into effective learning principles [8]. Differences in content quality, interactivity, and platform availability may affect learning satisfaction [9,10], but it is not clear which aspects are more important for online education in primary schools in China. Previous studies regarding the problems related to online learning have focused primarily on college students [11-14]. However, few studies have focused on elementary school students' experiences and satisfaction regarding online learning. Another limitation mentioned in previous studies is that they only looked at online learning satisfaction from the students' perspective. In fact, parents' opinions also have influence and inspiration [10]. This is worrisome as several characteristics (concentration, self-discipline, and related factors) could result in a host of problems during online education [15,16].

Therefore, this study aimed to determine the online learning experiences and attitudes of Chinese elementary school students and their parents, during the COVID-19 pandemic. Furthermore, the study evaluated the difference between parents' satisfaction with online education at the 10 day- and 40 day-mark.

Methods

Ethical approval

The study protocol was approved by the Research Ethics Committee of Chaohu Hospital, Anhui Medical University (202001-kyxm-07). The enrolled participants received detailed explanations of the study and signed electronic informed consent forms (the parents consent for the student to participate). All of their personal information is kept confidential, including their names and internet protocol addresses.

Survey questionnaire

The survey questionnaire was designed to assess the online learning experiences and attitudes of Chinese elementary school students and their parents (see supplementary material) based on the concerns of parents of elementary school students and previous questionnaires [17]. The questionnaire was completed by the student and one parent. In order to prevent selection bias from affecting the outcome, the parent was selected at random and chosen by the family. The questionnaire consisted of 16 items and focused primarily on obtaining basic information, including children's grades and the equipment used during online classes. Thereafter, a broader selection of information was gathered, including the levels of enthusiasm of online learning, the completion of online classes, the assigned homework, the pressure on parents, and related factors. Items 1–12 were answered by the parent while items 13–15 were answered by the elementary student. Item 16 was an open comment directed at the parent with regards to their opinions on online learning. In the satisfaction measurement, we used a 10-point scoring system (from 1 to 10 with the interval of 1); 1 represented the lowest degree of satisfaction, while 10 represented the highest degree of satisfaction. The questionnaire was written in Chinese and had not been translated into any other language. Primary education in China is compulsory for all children who reach a certain age (6-7 years old). Primary school students are usually between the ages of 6 and 13 in grades 1 to 6. In our questionnaire, primary school students only had to answer three simple questions, which they could understand and answer.

We pre-tested the questionnaire in five parent-child pairs of primary school students (not part of the research team) and seven psychologists. They pre-tested the questionnaire to determine the feasibility and understanding of the questions and words, providing feedback. The content validity of the final version of the questionnaire (I-CVI) was 0.86. The Cronbach's α of the questionnaire was 0.73, within the appropriate acceptable Cronbach's alpha range (0.70-0.95) [18,19]. On the basis of Kendall's sample size calculation method [20], the minimum sample size should be 10 times the number of items in the questionnaire plus 20% of the invalid questionnaires. Therefore, considering that the scale is composed of 16 items, the minimum sample size of this study is 192. Our study finally obtained 1008 valid questionnaires to meet the sample size requirements.

Survey protocol

The questionnaire was produced and distributed by the authors. The relevant data were subsequently collected through the online survey tool Questionnaire Star; a professional online survey evaluation platform [21]. Questionnaire Star is capable of designing questionnaires, collecting data, custom reporting, and analyzing the results. The authors sent a questionnaire link to potential participants via WeChat, which is the most widely used social media platform in China.

Eligible participants included any Chinese elementary school student, and their parents, who participated in online education during the COVID-19 pandemic. The questionnaire survey was conducted during two separate phases in the study. A 16-item questionnaire was distributed at the 10 day- and 40 day-mark after the first online course. In the first instance, to 867 parent-child pairs (867 elementary students and their parents) and 141 parent-child pairs in the second instance.

Statistical analysis

Participants' responses were proportionally expressed and recorded through a Likert scale that divided either into good/average/poor or yes/no responses. Continuous variables (i.e., satisfaction scores) were compared with the Student's t-tests. Categorical variables were compared through either chi-squared tests or Fisher exact tests. Data were analyzed using the PASW Statistics 20 (formerly SPSS Statistics; SPSS). P values < 0.05 were considered statistically significant.

Results

Characteristics affecting student and parental perceptions of online learning

The total number of participants included 867 parent-child pairs (one parent for each child) — 867 elementary school children and 867 their respective parents — during the first stage of the study. During the second stage, 30 days after the first interview, only 141 parent-child pairs (one parent for each child) were included in the study. Majority 35.1% (n=304), were grade 4 students (Table 1).

With regards to the equipment used in online classes, lower grade students were more likely to choose a TV. However, grade 6 students' equipment choices exhibited relatively similar ratios: mobile (25.8%), tablet (22.6%), personal computer (PC) (25.8%), and TV (25.8%) (Table 1).

Table 1 shows the enthusiasm of primary school students in grades 1 through 6 who participated in online learning courses. The results revealed that most students indicated enthusiasm with regard to engaging in online learning courses. Surprisingly, 22.6% of grade 6 students were not enthusiastic about taking online learning courses, which was statistically significant when compared with the other grades (Table 1).

With regards to the completeness, two sub-items were developed pertaining to online learning courses and the accompanying homework. Surprisingly, many of the students did not do well in the online classes or the homework after class (see Table 1 for details). Notably, the degree to which online classes were completed was higher in both grade 1 (50%, n=23) and grade 6 (41.9%, n=13) than in other grades; the difference proved statistically significant (P=0.047) (Table 1). Grade 6 students completed the largest amount of homework, while nearly half of the overall students performed well (Table 1).

This study designed three sub-categories of evaluation through which the parents of elementary school students could evaluate the quality of online courses, namely effectiveness, reliability, and abundance. Results show that the majority of elementary school parents indicated that the reliability, effectiveness, and abundance of online courses were perfect. However, the parents' views were inconsistent between the different grades. As such, more than 10% of grades 1 and 6 students rated the effectiveness of online classes as poor. Furthermore, 16.1% of the parents of grade 6 elementary students considered the abundance of online courses as insufficient.

Table 1. Characteristics affecting student and parental perceptions of online learning at the first stage (10-day mark)

		Grade 1 (n=46)	Grade 2 (n=207)	Grade 3 (n=129)	Grade 4 (n=304)	Grade 5 (n=150)	Grade 6 (n=31)	Chi-Square or Fisher's exact test	P
Equipment	Mobile	7 (15.2%)	82 (39.6%)	33 (25.6%)	109 (35.9%)	50 (33.3%)	8 (25.8%)	58.44	<.001
	Tablet	16 (34.8%)	14 (6.8%)	20 (15.5%)	33 (10.9%)	20 (13.3%)	7 (22.6%)		
	PC	6 (13.0%)	14 (6.8%)	8 (6.2%)	20 (6.6%)	13 (8.7%)	8 (25.8%)		
	TV	17 (37.0%)	97 (46.9%)	68 (52.7%)	142 (46.7%)	67 (44.7%)	8 (25.8%)		
Enthusiasm	High	27 (58.7%)	153 (73.9%)	103 (79.8%)	247 (81.2%)	123 (82.0%)	20 (64.5%)	24.494	.006
	Moderate	13 (28.3%)	31 (15.0%)	16 (12.4%)	31 (10.2%)	18 (12.0%)	4 (12.9%)		
	Low	6 (13.0%)	23 (11.1%)	10 (7.8%)	26 (8.6%)	9 (6.0%)	7 (22.6%)		
Course completeness	Good	8 (17.4%)	18 (8.7%)	11 (8.5%)	26 (8.6%)	10 (6.7%)	5 (16.1%)	18.536	.047
	Average	15 (32.6%)	39 (18.8%)	23 (17.8%)	47 (15.5%)	28 (18.7%)	8 (25.8%)		
	Poor	23 (50.0%)	150 (72.5%)	95 (73.6%)	231 (76.0%)	112 (74.7%)	18 (58.1%)		
Homework	Good	5 (10.9%)	17 (8.2%)	14	21 (6.9%)	9 (6.0%)	7 (22.6%)	17.113	.072

completeness				(10.9%)					
	Average	7 (15.2%)	36 (17.4%)	19 (14.7%)	51 (16.8%)	34 (22.7%)	8 (25.8%)		
	Poor	34 (73.9%)	154 (74.4%)	96 (74.4%)	232 (76.3%)	107 (71.3%)	16 (51.6%)		
Course effectiveness	Good	19 (41.3%)	85 (41.1%)	53 (41.1%)	322 (64.9%)	66 (44.0%)	9 (29.0%)	71.983	<.001
	Average	22 (47.8%)	114 (55.1%)	67 (51.9%)	157 (31.7%)	75 (50.0%)	17 (54.8%)		
	Poor	5 (10.9%)	8 (3.9%)	9 (7.0%)	17 (3.4%)	9 (6.0%)	5 (16.1%)		
Course reliability	Good	34 (73.9%)	153 (73.9%)	98 (76.0%)	236 (77.6%)	110 (73.3%)	18 (58.1%)	23.046	.011
	Average	8 (17.4%)	53 (25.6%)	26 (20.2%)	58 (19.1%)	35 (23.3%)	9 (29.0%)		
	Poor	4 (8.7%)	1 (0.5%)	5 (3.9%)	10 (3.3%)	5 (3.3%)	4 (12.9%)		
Course abundance	Good	25 (54.3%)	136 (65.7%)	91 (70.5%)	207 (68.1%)	94 (62.7%)	11 (35.5%)	25.599	.004
	Average	17 (37.0%)	61 (29.5%)	30 (23.3%)	87 (28.6%)	51 (34.0%)	15 (48.4%)		
	Poor	4 (8.7%)	10 (4.8%)	8 (6.2%)	10 (3.3%)	5 (3.3%)	5 (16.1%)		

Parents' perceived pressure and satisfaction regarding online learning

This study assessed the pressures that parents had to deal with during their children's online education. The study also measured the parents' satisfaction with online learning during the COVID-19 outbreak (Table 2).

As indicated in Table 2, the parents of lower grade students were under higher levels of pressure. The parents of grade 1 students (high pressure 45.7%, n=21) were generally the most stressed about their children's online lessons (Table 2).

With regards to their satisfaction, most of the parents were satisfied with the online learning courses; they scored above 6 points (10-point scoring system） (Table 2). In accordance with their parents, most of the students were satisfied with their online learning courses; they also scored above 6 points. Students and parents of grade 6 were the least satisfied, followed by those of grade 1. Interestingly, although the difference was not statistically significant, grade 6 students reported higher satisfaction scores than their parents.

The results indicate that most of the parents and students hoped to return to face-to-face learning in their future studies (94.9% vs. 93.5%) (Table 2). Interestingly, 16.1% of grade 6 students wanted to continue attending online classes in the future.

Table 2. Parents' perceived pressure and satisfaction regarding online learning at the first stage (10-day mark)

		Grade 1 (n=46)	Grade 2 (n=207)	Grade 3 (n=129)	Grade 4 (n=304)	Grade 5 (n=150)	Grade 6 (n=31)	Chi-Square or Fisher's exact test or F	P
Parents' pressure	Low	9 (19.6%)	87 (42.0%)	56 (43.4%)	124 (40.8%)	82 (54.7%)	12 (38.7%)	23.902	.008
	Average	16 (34.8%)	48 (23.2%)	22 (17.1%)	65 (21.4%)	22 (14.7%)	9 (29.0%)		
	High	21 (45.7%)	72 (34.8%)	51 (39.5%)	115 (37.8%)	46 (30.7%)	10 (32.3%)		
Parents' future choice	Online learning	4 (8.7%)	9 (4.3%)	3 (2.3%)	11 (3.6%)	14 (9.3%)	3 (9.7%)	11.851	.037
	School	42 (91.3%)	198 (95.7%)	126 (97.7%)	293 (96.4%)	136 (90.7%)	28 (90.3%)		
Parents' satisfaction		6.83±2.46	7.64±2.02	7.12±2.73	7.33±2.46	7.51±2.07	6.55±2.58	2.198	.053
Students' preference	Yes	25 (54.3%)	92 (44.7%)	67 (51.9%)	153 (50.3%)	78 (52.0%)	17 (54.8%)	3.430	.634
	No	21 (45.7%)	114 (55.3%)	62 (48.1%)	151 (49.7%)	72 (48.0%)	14 (45.2%)		
Students' future choice	Online learnin	3 (6.5%)	10 (4.8%)	8 (6.2%)	12 (3.9%)	18 (12.0%)	5 (16.1%)	16.517	.006

	g School	43 (93.5%)	197 (95.2%)	121 (93.8%)	292 (96.1%)	132 (88.0%)	26 (83.9%)	
Students' satisfaction		6.78±2.29	7.47±2.35	7.16±2.16	7.23±2.40	7.30±2.28	6.61±2.67	1.170	.322

The attitudes of elementary school students and their parents during the follow-up

This research was divided into two stages. The first stage of the investigation commenced 10 days after the online course began, while the second stage started 40 days after the course began. There were no significant differences in the elementary students' and parents' equipment use, enthusiasm, stress, or satisfaction between the two phases.

Regarding completeness, fewer students completed their courses and homework after class during the second stage than in the first stage. This difference proved statistically significant (27.5% vs. 7.8%; 26.3% vs. 7.8%) (Table 3). Furthermore, the parents indicated that the quality of the online courses in the second stage was lower than that in the first stage. This difference also proved statistically significant (95.0% vs. 92.2%; 96.7% vs. 94.3%) (Table 3).

Parents' as well as students' satisfaction levels with the online courses decreased during the second stage, as compared to the first stage's survey; however, the difference between the two stages was not statistically significant (7.35±2.35 vs. 7.25±2.43; 7.21±2.41 vs. 7.13±2.45) (Table 3).

Table 3. The attitudes of elementary school students and their parents during the follow-up

		Baseline (n=867)	Follow-up (n=141)	Chi-Square or Fisher's exact test or t	*P*
Equipment	Mobile	289 (33.3%)	41 (29.1%)	3.272	.352
	Tablet	110 (12.7%)	16 (11.3%)		
	PC	69 (8.0%)	8 (5.7%)		
	TV	399 (46.0%)	76 (53.9%)		
Enthusiasm	High	673 (77.6%)	112 (79.4%)	0.643	.725
	Moderate	113 (13.0%)	15 (10.6%)		
	Low	81	14		

			(9.3%)	(9.9%)		
Completeness	**Course**	Good	78 (9.0%)	1 (0.7%)	26.130	<.001
		Average	160 (18.5%)	10 (7.1%)		
		Poor	629 (72.5%)	130 (92.2%)		
	Homework	Good	73 (8.4%)	2 (1.4%)	23.277	<.001
		Average	155 (17.9%)	9 (6.4%)		
		Poor	639 (73.7%)	130 (92.2%)		
Quality	Effectiveness	Good	554 (52.3%)	51 (36.2%)	13.266	.001
		Average	452 (42.7%)	79 (56.0%)		
		Poor	53 (5.0%)	11 (7.8%)		
	Reliability	Good	649 (74.9%)	89 (63.1%)	8.715	.013
		Average	189 (21.8%)	44 (31.2%)		
		Poor	29 (3.3%)	8 (5.7%)		
	Abundance	Good	564 (65.1%)	96 (68.1%)	0.731	.694
		Average	261 (30.1%)	40 (28.4%)		
		Poor	42 (4.8%)	5 (3.5%)		
Parents	Pressure	Low	370 (42.7%)	62 (44.0%)	0.083	.959
		Average	182 (21.0%)	29 (20.6%)		
		High	315 (36.3%)	50 (35.5%)		
	Future	Online learning	44 (5.1%)	4 (2.8%)	1.339	.247
		School	823 (94.9%)	137 (97.2%)		
	Satisfactory		7.35±2.35	7.21±2.41	0.632	.527
Students	Preference	Yes	432	64	0.955	.328

		(49.8%)	(45.4%)		
	No	435 (50.2%)	77 (54.6%)		
Future	Online learning	56 (6.5%)	8 (5.7%)	0.126	.723
	School	811 (93.5%)	133 (94.3%)		
Satisfactory		7.25±2.43	7.13±2.45	0.525	.599

Parents' open comments concerning elementary school students' online education

In the open comments, participants (parents) indicated that online classes effectively utilized their time and network, so that classes were not suspended during the COVID-19 pandemic. On the deficiency side, parents mentioned six main issues: (1) disappointment regarding timely interaction in online courses; (2) worry about students not understanding the course; (3) increased burden of annoying adult responsibilities; (4) concern regarding children's eyesight; (5) concern that teachers' explanations were not detailed enough; (6) concern in the decline of students' interest and attention. We summarized the details in Table 4.

Table 4. Summary of parents' open questions

Rank	Rates and details 73% (736/1008) of parents answered open questions.
Top question	19% (188/1008) of parents thought that the interactions during the classes were inadequate. They stated that online educational videos were taped in advance so that there was a lack of question-and-answer interactions between teachers and students. They suggested measures should be taken to ensure that teachers are aware of children's questions so that they can respond specifically to questions or correct children's mistakes.
Second-ranked question	15% (153/1008) of parents were concerned that children could not understand the content of online educational videos.
The third-ranked question	14% (137/1008) of parents complained that teachers' demands, including monitoring children's online study, checking homework, and regularly giving feedback on students' learning, greatly increased their workload, stress, and annoyance. Furthermore, a few parents are poorly educated and could not

	check their children’s homework.
The fourth-ranked question	12% (125/1008) of parents worried that prolonged exposure to electronic screens will lead to a decline in their children's eyesight.
The fifth-ranked question	12% (122/1008) of parents thought that the online class durations were too short and the teachers’ explanations were not detailed enough. Only two parents felt that the online class durations were too long.
The sixth-ranked question	4% (37/1008) of parents claimed that online teaching lacks the learning and competitive atmosphere and that student’s initiative and enthusiasm were not high.

Discussion

The COVID-19 pandemic has radically changed many aspects of our lives. Furthermore, social distancing and restrictive movement policies have markedly derailed traditional educational practices [22-24]. Consequently, there is a pressing need to innovate and implement alternative educational and assessment strategies [25,26]. However, the COVID-19 pandemic has provided an opportunity for greater implementation of digital learning in elementary education with the requirement that students must stay at home [27]. The convenience and flexibility afforded by these online classes seem to contribute toward their proliferation and popularity [28].

Although previous studies assert that learners gain slightly less knowledge in online environments [29-31], our survey results (in the study’s first phase) showed that 95% of parents believed that the online courses were effective and able to convey knowledge. Conversely, a study from Ghana found that only 40 (18.7%) of their respondents agreed that they were able to learn effectively at home while 174 (81.3%) respondents disagreed with that statement [32]. These differences may be related to different preparation times, study content, and the equipment used for online courses in different countries. There is an abundance of content for online learning courses in China since the educational content of online courses was prepared earlier after the onset of the pandemic. Furthermore, the courses were designed so that students can use a variety of devices to participate, including students from families that do not have internet connections; they can still access the courses through their TVs. These measures have significantly increased the effectiveness of online learning in China. However, it is worth noting that during the second survey the proportion of respondents who thought that online courses were effective had decreased. This may be due to long online lessons, which makes it difficult for children to concentrate, reducing their productivity. The number of participants in the second stage was only quarter of the first stage. The reason may be that the enthusiasm for the online survey

of the parents of the students declined at this time.

Satisfaction is a vital factor when determining the quality of online learning [33-35] since it reflects students' pleasure and fulfillment levels with regards to different aspects of the learning services [36]. This study indicated that most parents were satisfied with the online learning courses; they scored above 6 points. In accordance with their parents, most students were satisfied with the online learning courses; they also scored above 6 points. The parents as well as students' satisfaction with the online courses decreased during the second stage; however, this difference did not prove to be statistically significant.

Grade 6 students and their parents were found to be the least satisfied, followed by those of grade 1. These participants felt that the courses were ineffective, unreliable and that the content was not abundant. Therefore, for primary school students and parents, curriculum quality is closely related to satisfaction. It is important to consider that grade 6 learners are under pressure due to the junior high school entrance examinations. This is notable because online classes only teach basic knowledge and lack the ability to conduct extracurricular classes to improve exam scores. Grade 1 students experience cognitive pressure because they have just entered primary school from their carefree kindergartens; therefore, they are more likely to develop adjustment disorders, which cause a lower evaluation of the curriculum's quality.

Other studies concerned with satisfaction have indicated that there are certain factors that affect students' satisfaction with online learning environments, such as their interactions and self-regulation [37,38]. Parahoo's study indicated that the interactions between students and teachers, or classmates, are an important dimension of students' satisfaction with online learning [39]. Kuo and colleagues found learner-instructor and learner-content interactions to be significant positive predictors of students' satisfaction [40]. Another study's findings support the idea that learner-instructor interactions contribute to students' satisfaction [41]. In this study's open comment section, the most frequent comment referred to the lack of interaction during online learning. This may account for the drop in satisfaction during the second survey. Sun and colleagues noted that students' main difficulties during online learning were staying motivated, adhering to schedules, and studying regularly [42]. Compared with the first stage of our study, only 7.8% of students completed their courses and finished their homework on time after a one-day online learning class. Due to the psychological characteristics of children, few elementary students were able to consistently complete their online lessons and maintain self-discipline [43].

Consequently, one advantage of our research is that the causes of parental anxiety related to online lessons is assessed. The factor that most frequently hindered students' learning was identified as a lack of interaction in parents' open comments. Online courses are taped in advance, so there was a lack of two-way and timely interaction between students and teachers. The results indicated that students

generally received information passively and lacked active communication during their online classes. Furthermore, students often did not understand certain questions. Consequently, students may lose interest in online classes over time. Another potential problem is that long online courses may cause students to become addicted to their computers and TVs. Furthermore, prolonged exposure to computers, mobile phones, or TVs could cause vision loss in elementary school students.

Our results indicated that the lack of interactivity may be the most important factor affecting Chinese primary school students' satisfaction with online courses. The online lessons in this study were recorded in advance and played to primary school students later, which resulted in the one-way flow of teaching information in practice. This is worrisome because clear explanation and communication to clarify questions are especially important for distance learners. In contrast, online education in developed countries has seen some improvement and enhancement. They emphasized more on interactivity and student participation and considered this factor when planning online courses. For example, Hrastinski put forward a theory in his research: “If we want to enhance online learning, it needs to enhance online learners' participation and interactive experience [44].” Suppan and his colleagues used a highly interactive online learning module–its characteristic was tailored for customers’ timely feedback and prevented content skip mechanism–the result showed that it could enhance the medical students’ asynchronous distance learning in knowledge acquisition [9]. Synchronous E-learning based on interactive live webcasting has also been verified to be effective and feasible [45]. These results are consistent with our conclusions.

The results of low homework completion and high pressure on parents suggest that the current online learning tasks may be beyond the capacity of students and parents, and may cause parent-child conflict and emotional problems. Our data are consistent with another web survey in China, which said the parents' Anxiety Self-rating Scale (SAS) results showed that the degree of anxiety was higher than usual; meanwhile 17.6% of students were suspected of having emotional problems during online homeschooling [46]. A previous survey showed that 73.9% of primary and secondary school parents felt that their burden had increased; in comparison, the burden on parents of primary school students in grades 1-3 has increased more (79.3%) [47].

In the current study, 14% of parents complained about having to supervise their children, check their homework, and frequently deliver feedback to the teachers. This considerably increased their workload, stress, and annoyance. Moreover, several parents were unable to help their children, as they were uneducated. According to a previous study, there has been an alarming increase in child abuse and domestic violence in Brazil during the pandemic, which may be related to family’s financial constraints, increased parental burden due to school closures, parental stress, and the difficulty of dealing with children's irritability during isolation [48]. In our survey, one parent wrote in the open question that when he was supervising his kid, the kid was undisciplined in class and perfunctory in doing his homework. The parent became

particularly irritable and violent, and even beat the kid. The reason may be that parents are endlessly nagging when they are supervising the study and correcting homework. This often makes children feel that the space for independence is greatly compressed, giving rise to conflicts between parents and students.

It is generally believed in the academic circles that there is a utilitarian education and teaching concept in China. Teachers who believe that practice makes perfect require students to do a lot of exercises during and after class. Since online courses in primary schools are pre-recorded and lack teacher-student interaction, teachers transfer their responsibility for correcting homework to parents, which increases conflict and stress. These results thus offer a new strategy to solve parent-child conflict and emotional problems during online homeschooling.

Limitations

There were several limitations to this study that needs to be discussed. First, the sample size was not very large; in future studies, a larger sample size should be selected to validate this paper’s results. Second, this study did not compare the test scores of elementary school students before and after their online learning. Test scores can provide a more intuitive perspective on the effects of online learning. However, due to regulations by the Ministry of Education, we were unable to obtain the scores of the elementary school students. Third, our scale does not consider demographic data, such as age, gender, or subjects’ household incomes. Accordingly, it was impossible to compare the differences between participants’ demographic data. This is problematic because elementary school students of different ages, gender, or income levels may have different experiences and attitudes toward online learning. Lastly, we did not investigate teachers' attitudes toward online learning. These issues need to be explored in future research.

Conclusion

To the best of our knowledge, this is the first investigation evaluating the experiences and attitudes toward online learning in two generations in the same family during the COVID-19 pandemic. Online learning can prevent the spread of infectious diseases while enabling elementary school students to gain knowledge. Most enrolled elementary school students were very enthusiastic about participating in online classes, and both the students and their parents were satisfied with these classes. Students were able to adequately complete all of their lessons and homework assignments after school during the initial phase of online learning. However, as time went on, the percentage of students who completed their lessons and homework on time decreased. At this later stage, the satisfaction of the students and their parents with online lessons decreased. However, some online learning tasks may be beyond

the reach of elementary school students and parents and may cause emotional and behavioral problems. This study provides evidence for policy changes aimed at reducing pressure on parents and improving mental health levels, including prohibiting teachers from assigning the task of checking homework to parents, and increasing the interaction of online classes between teachers and students.

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Conflict of interest

None declared.

Data availability

All the data supporting our findings have been presented in the manuscript; the datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Abbreviations

COVID-19: Corona Virus Disease 2019
TV: Television
PC: Personal Computer

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Supplementary Files

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