# The Pandemic's Effect on Parental Expectations of Early Education in China

An Interactive Qualifying Project Report
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by
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# Abstract

The COVID-19 pandemic has made the future of education uncertain. Parents must count on kindergartens to prepare their children for this new world of high expectations and policy change. We conducted a survey and several interviews asking parents with children ages 0-6 in both the United States and China about what changes they would like to see in schools to adapt to these challenges. Through this data collection, we learned that these children were not as negatively affected by the pandemic as anticipated. At this age, parents wish for their children to explore the world around them and their own interests. As a result of our findings, we were able to provide recommendations to our sponsor on how they can adapt to these new expectations. We hope their Montessori school system can find a hopeful future in a post-pandemic environment.

## Acknowledgements

We would like to thank all the hard-working individuals and groups who made this project possible. Firstly, we would like to thank our advisors, Professor Hansong Pu and Professor Joseph Sarkis, who guided us through the process and provided helpful insight. Additionally, we would like to thank Professor John-Michael Davis for giving us feedback in the early stages of our project. We are very grateful for the hardworking students from Hangzhou Dianzi University, Sameer, Andy, Bron, Leo, Marugo, Rainie, Zhengyanhan, and their advisor, Professor Xu. Lastly, we would like to thank our sponsor, Yimi Children's House and liaison, Kathy Wei for trusting us to conduct this project and helping us define our goals.

# Executive Summary


## Project Goal

The goal of this project was to learn how parent expectations and concerns for kindergartens have changed due to the challenges caused by the COVID-19 pandemic. To reach this goal, we sought to interview and survey parents with children ages 0-6, which was the target demographic for current and prospective kindergarten parents. We analyzed the data collected by our team as well as data collected by a student team from Hangzhou Dianzi University (HDU). The results of this study were used to provide recommendations to our sponsor, Yimi Children's House, on how their schools can adapt to these changes.

## Background Research

Our team's background research aimed to understand what early education in China was like during the midst of the pandemic and how that affected early childhood development. We studied aspects that may influence a child's home learning experience, such as family dynamics and methods of online learning. We also researched the reaction to the sudden shift to learning and setbacks that came from it so we can anticipate what the parents have to say. To find the effect on development, we also researched major developmental milestones that children should reach during the age range that we were studying. Our background research brought context to our project and guided us in making effective survey and interview questions; and provided insights for our findings and recommendations.

## Methods

To accomplish our goal, our team gathered data from parents of children ages 0-6 through conducting surveys and interviews. With help from HDU, we started by interviewing parents to gain an understanding of their expectations for their children. We used those answers to build a survey that was distributed to parents across the United States. Finally, we conducted follow-up interviews with survey participants to further discuss the topic.

The purpose of the pre-interview surveys was to gain more context for our topic before finalizing and distributing our survey. Our background provided statistical insights on the pandemic's effect, but the opinion of parents may have been different. These interviews aimed to fill that knowledge gap and give us a sense of what parents are thinking so we did not miss any

points in our survey questions. The HDU team was able to conduct three interviews using questions formulated by the WPI team and based off our background research.

Using information from our background research, interviews, and insight from our sponsor, we created and distributed a survey to parents around the United States. The survey began with demographic questions that relate to a child's demographic. They were followed by some Likert-type scale questions that relate to our goal. We distributed the survey through our personal connections, local organizations, and reaching out to parent groups on Facebook,

Lastly, we concluded our data collection by conducting follow-up interviews. These interviews were held over Zoom and intended to answer our research questions in higher detail. Parents were asked to elaborate on their survey answers and discuss their opinions on our team's goals.

Parallel to our team's survey, the HDU team distributed their own survey to parents in China. Both teams shared data with each other to provide a cohesive analysis of parents from both the US and China. The WPI team collected 50 survey results and HDU collected 118. Our team also completed four follow-up interviews.

**Findings and Analysis**

After collecting our survey and interview data, our team analyzed our data along with the data from the HDU team to start creating recommendations. We performed a statistical analysis on our survey data using the mean, standard deviation, and variance values as well as organized our survey data by performing an unequal variance T-test based on the differences within the following demographics: type of education the child is enrolled in, whether the child participated in online learning, and whether the parent worked remotely. We then supported our findings by analyzing our interviews and comparing the findings to the HDU team's findings to create more relevant and robust conclusions. The overarching goal of our analysis was to understand how the pandemic affected development and parental expectations of education to learn what changes parents would like to see in schools.

Overall, our data showed some negative effects on development and mostly an effect on stress when it came to home life. These results were different when looking towards specific demographics and their differences. The biggest differences we found were more towards the pandemic's effect on development and what parents would like schools to emphasize. Children who participated in online learning were more negatively affected with their development

compared to those who did not participate. Parents of those children wanted more of an emphasis on the areas of learning we emphasized in our surveys with the main areas being independence and creativity.

There was a similar trend for parents who worked in-person. Parents of children in public school also had a similar trend, but only for the areas of learning. According to our survey data, those that are enrolled in public school had less of a negative effect on development compared to those in private school. Most of the differences found within each demographic were neither noticeably large when comparing means nor were they statistically significant based on the p-values that we calculated for the T-test.

Most interview data supported our overall finding that the pandemic had some effect on children's development, but not enough that they would cause great delay in development. In the same vein, their home life was not significantly affected except for parental stress due to varying reasons such as taking care of their children and worrying about how the pandemic affected their children. In terms of what parents expect of their children's education, we learned from interviews and deduced from our survey that they did not have any major plans for their children, just that they wanted their children to find their own interests.

Next, we focused on what parents would like to see from schools with our last survey question. From the responses we find the areas of learning that ranked the highest were creativity and independence. These factors were from HDU's pre-survey interviews as well as the areas of learning that Montessori education emphasizes.

We also observed that communication skills had one of the higher scores which confirmed what we heard in follow-up interviews. When asked about what parents want schools to change during our follow-up interviews, a consensus emerged that early childhood education schools should place less emphasis on academic learning and more on creative expression, hobbies, interests, and collaboration. These results confirm interview data that HDU collected where parents wanted more focus on children's interests. These main points will inform our recommendations for the sponsor's kindergarten.

**Conclusions and Recommendations**

Using data analysis and interviews, we arrived at three recommendations for the sponsor. We hope these recommendations will help improve our sponsor's school and better appeal to prospective parents.

The most important change parents want to see in schools is an increased focus on recreational time. Parents want their children to explore the world around them and form their own interests and hobbies.

In exchange for more play time, schools should focus less on their academic curriculum for this age group. Though learning to recognize letters and count numbers is crucial, parents believe the current pace that children learn to read and write can be slowed down. They want to allow their kids to stay kids for longer.

In addition to our team's research, we used the data from the HDU team to create a third recommendation. The pandemic caused families to stay home more often, creating more time for parents to interact with their children. We found that this strengthened most parent relationships with their children, and schools should incorporate that into their teaching. To increase parent involvement, we recommend having more parent-child days where the parents get to interact with their kids and giving the parents other activities to do with their child at home.

Our team also faced several challenges while collecting data. The main problem was we were unable to travel to China due to COVID-19 restrictions. This meant we had to frequently communicate with the HDU team over email, video chat, and text. The time difference between teams left some messages unread for several hours, slowing down our progress. We also faced a problem with the language barrier. Since no one on the WPI team speaks Mandarin, we had to rely on the HDU team's English skills to communicate. The WPI team would often talk too quickly for the HDU students to understand, and we often had to repeat ourselves to get our message across.

Overall, our team learned that the COVID-19 pandemic had a smaller effect on children ages 0-6 than expected. We found that parents want less emphasis on reading and writing and more emphasis on creativity and independence. This shift in expectation lines up with the ideals of a Montessori way of teaching, leading us to conclude that our sponsor has a bright and hopeful future in a post-pandemic world.

# Authorship

All three team members, Justin Kyi, Kelli Huang, and Sydney Russell contributed equally to the research, data collection, and writing of this IQP report. In the early stages of writing, each member wrote their own portion of the background research and methods section. We then peer edited each other's sections to ensure their quality. The interview and survey questions were created through detailed discussions between all members. Since we were unable to travel abroad, our HDU team provided data collected from parents in China to help with our research.

***Justin Kyi***

Justin served as the main communication with the sponsor about project objectives and updates. As a result, he created and regularly updated the team's Gantt chart in accordance with any changes and progress made. He also aided Sydney with performing a statistical analysis of questionnaire data and organizing the data, coauthoring the findings section along with the executive summary, introduction, and conclusion sections. In addition, he proofed the references section to ensure all citations were in the 7$^{th}$ edition APA format.

***Kelli Huang***

Kelli served as the main communication with the student team from HDU. She developed questions for the post-survey interviews and was the main speaker for all interviews and most advisor meetings. While Justin and Sydney worked on data analysis, Kelli wrote the abstract, acknowledgements, and limitations sections and contributed to the executive summary and findings sections. She also rewrote the methods section after we collected data to describe our procedures more accurately.

***Sydney Russell***

Sydney served as the primary creator of the questionnaire and was responsible for creating posters, flyers, and posts on Facebook and MTurk to spread the questionnaire. As a result of overseeing the questionnaires, she worked on the data analysis portion co-authoring the findings with the help of Justin and recommendations with Kelli. During follow-up interviews, she also helped Kelli as a secondary speaker to provide further questions. To keep the paper organized, she also created and maintained the Table of Contents and List of Tables.

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# 1. Introduction

On March 7th of 2020, The World Health Organization officially declared the start of the COVID-19 pandemic shaking society to its core (Ryan, 2021). The world was isolated as social measures were put in place to prevent the spread of the virus including social distancing, wearing masks, and restricting large gatherings. “It’s been almost three years since governments initially shut down schools during this time causing the education system to switch to online learning” (Azevedo et al., 2021). Parents who were just used to dropping off their kids at school, now must monitor and help with their children’s education along with working their job and doing household chores. This switch led to children and parents facing difficulties interacting with each other and adjusting. This situation resulted in a substandard learning environment leading to possible development issues as skills children were meant to have seem to be lagging behind their older peers. This decrease in quality of education was especially significant for early education [ages 0-6] which is one of the most crucial learning periods for childhood development (Britto et al., 2017).

During this age children develop emotional, social, motor, and cognitive skills—the major developmental milestones. Some skills that these milestones encompass are walking, building relationships with peers, and being able to distinguish emotions. This early development period is critical in the long run for a child’s future as it provides a foundation of knowledge and skills for the rest of their lives.

Almost three years have passed since the pandemic started and at the tail end of it people are now struggling with returning to everyday life. Parents, who make most of the decisions for their children’s education, now must decide which school to send their kids to and what foundation they will give their child to be successful in a post-pandemic world. In China where education is competitive, this is more pronounced as parents must worry about other cultural norms, socioeconomic factors, and social events caused by the pandemic. This also means that early educational institutions, namely kindergartens, must figure out how to adapt to these changes to provide an optimal learning environment for children. Our sponsor, Yimi Children’s House, is such an institution that must adjust to the changes caused by the pandemic.

## 1.1 Our Sponsor

"一米儿童之家," Yimi Children's House is a network of Montessori schools in Hangzhou, China established in 2013. Yimi provides education to children ages 0-6 within three different grade levels: Nido (0 – 18 months), IC (19 months – 3 years), and CASA (3 – 6 years). Yimi is committed to high academic standards and fuses international Montessori teaching with traditional Chinese culture to form a unique and well-rounded curriculum that focuses on children exploring their own interests and talents. They accomplish this purpose by providing a personalized, 1-to-1 education program to let each child grow and explore in their own way. Their large open environments, as seen in Figure 1, allow children to experiment with their interests and help provide their interactive teaching methods. However, the changes caused by the COVID-19 pandemic created limitations on their primary teaching methods such as the inability to be physically in the classroom meaning the children cannot wander around and find their own interests. Our research aims to help our sponsor improve their teaching style after facing these challenges.

Figure 1: A Yimi Montessori classroom. Notice the open environment and the small number of seats within the classroom.

## 1.2 Remainder of the Interactive Qualifying Project Report

In collaboration with Hangzhou Dianzi University (HDU) and our sponsor, Yimi Children's House, our Worcester Polytechnic Institute (WPI) team researched the pandemic's

effect on parental expectations of early childhood education and early childhood development in China to develop recommendations for our sponsor's kindergarten on how to adjust to the shifts that the pandemic caused by answering the following research questions:

1. How has the pandemic shifted educational parental expectations for their children?
2. What changes to education would parents like to see in schools?

In these next sections we will discuss the background of early educational development, the effect of the pandemic, and Chinese society to contextualize our objective. We will then discuss the methods for constructing interviews and survey on Chinese parents as well as American parents. The survey instruments within our methods will have justifications for questions based on our background research.

After our methods, we will display our findings based on our analysis of survey data. Our findings will be supported by all interviews conducted and compared to the survey data collected by HDU to provide more robust conclusions. We will focus on the survey data involving the effects of the pandemic and what changes parents would like to see in schools.

Next, we will provide recommendations to kindergartens based on the parent's responses. These recommendations fall under the theme of less of an academic focus in early education and more focus on creativity and recreation. We will also discuss limitations and shortcomings of the projects such as time constraints, language barriers, and specific issues with our surveys. Finally, we will conclude with a summary of our project, findings, and perspective based on the recommendations.

## 2. Background

Mask mandates, social distancing, and stay-at-home protocols during the Covid-19 crisis were especially detrimental to children's education. Schools were shut down rapidly and replaced with remote classes, which lacked the social environment of in-person learning. As a result, several key developmental milestones in children were not properly met (Viola & Nunes, 2022).

In Chinese culture, parents are heavily involved in planning their children's future due to having rather unique culture and social standards. Most of traditional Chinese culture is deeply rooted or influenced by Confucianism including family and societal roles. One of the key factors of Confucianism is the idea of filial piety. This is where the family is deeply respected and should come before the individual (Chan & Tan, 2012). In this case, Elders are treated with the most respect where the children must be devoted to one's elders, specifically the parents and any decisions they make. Another aspect is that the family is seen as one collective and any action of an individual is reflected upon the family (Slotes & De Vos, 1998). Therefore, the actions and achievements of the children reflect on the parents and the family including their education. Since these achievements are reflected in them, parents tend to have higher expectations for their children and what their future might hold. However, the pandemic's socio-economic effects have caused parents to reconsider these plans.

There is also the difference between Western societies such as the U.S. that focuses heavily on individualism while Chinese culture is more collectivist. Chinese society also tends to be more rigid than in the West, having more restrictions. These cultural and social differences can also show how the government and people treated the pandemic. Countries and regions who had looser cultures tended to have less restrictions and had more cases as fewer people were isolated (Gelfand et al., 2021). China being more culturally tight therefore had a greater number of social norms and isolation measures against the pandemic. One social norm that may have affected restrictions is the idea of respecting or taking care of your elders (Chan & Tan, 2012). This would also mean an increase as well as prolonged restrictions to protect the elderly. The longer these restrictions go on the more consequences there will be for the children's development and academic success.

In this section, we will discuss the important effect that early education has on children's social development, and how the pandemic disrupted that crucial period for children throughout

China. We will explain the implementation of online learning and the reality of the stay-at-home mandates. These events will be connected back to the cultural practices in China, where parents have high expectation for their children to succeed.

## 2.1 Defining Major Developmental Milestones in Children

Before discussing how the pandemic affected children's development, we will define major developmental milestones concerning emotional development, social development, motor skills, and communication skills (see Table 1 for examples of motor, communication, and social skills).

| Composite milestone means | Developmental Milestones | Description |
|---|---|---|
| Language | 1. "Turning head in the right direction | The child can turn his/her head in the right "direction" if you, e.g., say: where is "mom", "dad", "the light" etc. |
| | 2 "Naming objects/ animals" | The child can name a few, familiar objects or animals with their true names |
| | 3. "Naming objects/ animals in pictures" | The child can name a few, familiar objects or animals in pictures with their true names |
| | 4. "Forming a sentence" | The child can put at least three words together to form a sentence |
| | 5. "Speaking properly" | The child can speak properly |
| | 6. "Sharing experiences" | The child can talk about what he or she has experienced |
| Walking | 7. "Walking" | The child can walk around unassisted in the living room |
| | 8. "Climbing stairs" | The child can climb stairs unassisted |
| Eating | 9. "Drinking from a cup" | The child can drink from a cup without assistance |
| | 10. "Eating with spoon" | The child can eat with a spoon without assistance |
| | 11. "Putting on socks" | The child can put socks on by himself or herself |
| | 12. "Doing buttons" | The child can do buttons |
| Social Interaction | 13. "Building tower" | The child can build a tower of 4-5 ordinary rectangular blocks |
| | 14. "Helping at home" | The child shows interest in helping at home by imitating parents (e.g., by laying the table or other domestic tasks) |
| | 15. "Picking up things" | The child can pick up things in the apartment if requested |
| | 16. "Playing with peers" | The child plays with children of the same age (e.g., rolling a ball to each other) |
| | 17. "Distinguishing boys and girls | The child can distinguish between boys and girls |

| | | |
|---|---|---|
| Toilet Training | 18. “Bowel control” | The child can tell when he or she needs to defecate |
| | 19. “Dry during the day” | The child is drying during the day and tells when he or she needs to go to the toilet |
| | 20. “Dry during the night” | The child is dry during the night |

Table 1: Various childhood developmental milestones (Source: Flensborg-Madesen et al., 2018).

A study from van Buuren & Eekhout (2021) defines measurements for a multitude of childhood developmental milestones by analyzing developmental data of children ages 0-2. They focus on this specific age range because the first two years is where the rapid change occurs since the brain is most adaptable during that time (Buuren & Eekhout, 2021, p. 3). In their study, they define major milestones pertaining to motor skills (such as stepping, walking, and placing blocks) and communication skills (such as waving when saying “goodbye” and reacting when spoken to) which can relate to cognitive development in schools, such as reading skills. Horowitz-Kraus et al. (2017) researched developmental aspects that comprised a better reader within children of ages 1-6. They found that as children grow up, they apply more of their language and motor skills to improve cognitive skills such as attention span, verbal fluency, and working memory which relate to improved reading.

Motor skills development can also benefit cognitive development by exploring the process involved in performing a movement such as the importance of purpose behind an action (Hofsten, 2004). When an infant performs an action, such as picking up an object, they imitate the purpose of the action rather than the form of the action itself. This action can be seen in the nuances of how infants pick up objects (Hofsten, 2004). Having a purpose for an action goes together with environmental perception. When looking back at the example of picking up an object, an infant will have the purpose of picking an object up and will need to understand the surrounding environment to adjust their hand and body position to be able to reach said object. Having proper motor development can also relate back to communication skills since knowledge of how to perform an action can help infants later in understanding the actions of others.

Along with gaining motor and communication skills, the early ages (around 0-6) are also important for proper social and emotional development. The following five dimensions of social-emotional development in children outline key developmental aspects: social competence,

attachment, emotional competence, self-perceived competence, and temperament/personality. (Denham et al., 2009). These dimensions will be used later in the study to define what social and emotional development specifically mean. Social development of infants, toddlers, preschoolers, and kindergarteners include important milestones such as interest in people in infants, playing with others in toddlers, and friendship formation in preschoolers and kindergarteners. Emotional competence milestones include expressing basic emotions such as happiness and sadness in infants and toddlers and more nuanced emotions such as guilt in preschoolers. It is important to consider all of these milestones in mind when looking at how the pandemic affected childhood development and education.

## 2.2 Transition to Online Learning

Following an extended Spring Festival Holiday in January 2020, the Chinese Ministry of Education quickly pioneered and implemented their new education plan, "Suspending Classes Without Stopping Learning (SCWSL)" (Zhu, Liu, & Hong, 2021). This section will discuss the types of online learning that the Chinese schools used and how each mode differently affects a child's development. We will also discuss the student's and parental reactions to the sudden shift to online learning. The mostly negative responses present the pressing need for schools to change their curriculum to support the lack of development in oncoming students.

### 2.2.1 Online Learning Methods

There are four main ways of online learning: synchronous teaching, asynchronous teaching, flipped classroom teaching, and tutoring-based teaching (Li, Xu, & Xue, 2020). Each method has its own strengths and weaknesses. Looking into how students learned during the pandemic highlights which developmental skills were most affected and therefore which skills now need the most attention.

The synchronous learning method consists of the teacher delivering real-time lectures to the students through various live-streaming platforms, such as Zoom, ClassIn, and CCtalk. (Li, Xu, & Xue, 2020). Students can receive immediate feedback since their classes are live and they can also interact with their peers during discussion groups, proving social stimulation. Since the students are not in person, however, it takes more effort and thinking to participate. In a national survey conducted on children and parents in China, one child stated, "I used to just raise my hand and answer a question. Now I have to press a button. I don't like that." (Zhu, Liu, & Hong, 2021). Unlike in-person learning where interactions come naturally, the online medium makes it

very easy for a student to turn off their camera, mute their microphone, and actively choose to not participate. This may cause a delay in developing proper social skills, especially for younger kids who do not have much experience with learning before the pandemic.

The asynchronous method of teaching consists of the teacher recording lectures beforehand, then uploading them to their learning platform for students to watch on their own time (Li, Xu, & Xue, 2020). This lets students speed up or pause the recordings at any time, allowing them to learn at their own pace. The downside of this method is that it heavily relies on a student's self-regulation. If the student does not have the motivation to watch the lectures, they may fall behind very easily. Since the lectures are pre-recorded, the teacher cannot provide immediate feedback to the students or change their teaching method to adapt to the students' learning. Most importantly, students are fully deprived of peer interaction with this method, which negatively affects their development of social skills.

In flipped classroom teaching, the teacher posts a brief video explaining their topics that the students watch independently before class. During the live class, the teacher spends time giving examples of the topic as well as answering student questions and providing feedback. They may also divide the students into groups to discuss with their peers. After class, students follow up with an assignment or test to complete to make sure they absorbed the information (Li, Xu, & Xue, 2020). This method of blended learning promotes independence in students while also maintaining the teacher-student relationship. It saves time during the live lectures, giving the students more opportunities to ask questions. Since more class time is spent on discussion, students receive both social and cognitive stimulation when solving practice problems. However, this method also relies on the student's self-regulation. If they do not watch the pre-class videos, they may get lost or confused during the live class, and the effectiveness of this method would greatly decrease.

In addition to the students learning through the previously discussed teaching modes, tutoring-based teaching provides one-on-one learning between a student and a tutor (Li, Xu, & Xue, 2020). This method ensures that the student fully understands the topic and fills in any knowledge gaps they may have. Tutoring tends to each student's specific needs and greatly helps counter the issues created by online learning. The downside of tutoring is that it is not a complete alternative to in-person education, it is just a complement to the other teaching methods. Parents also may not be able to afford private tutors for their children.

### 2.2.2 Implementation of Suspending Classes Without Stopping Learning

In order to maintain online learning on such a massive scale, the Ministry of Education of the People's Republic of China took careful consideration and constantly responded to feedback when implementing "Suspending Classes without Stopping Learning" (SCWSL). Firstly, the Ministry of Education widened the public's access to educational resources by releasing high-quality online courses and teaching resources for free. They placed high priority on maintaining public service platforms and online communication platforms to ensure all students had access to these resources. The Department of Teacher Education worked with institutions to properly prepare teachers for online learning (Zhang et al., 2020). Since the policy was enforced through all regions in China, local authorities and schools were left to decide exactly which teaching styles worked best for them.

In a notice from the Ministry of Education about the work arrangement for primary schools, they stated, "There are no uniform and rigid requirements for online learning in the lower grades of primary schools. Parents and students can choose voluntarily and make specific regulations on time and limit for students in other grades" (Ministry of Education of the People's Republic of China, 2020). Since teachers were encouraged to constantly adapt to changes, all four of the previously described teaching methods were used, leading to the previously mentioned drawbacks of online learning. The Ministry also emphasized student mental health, understanding of academic subjects, and life skills. Opening educational resources to the public and guiding teachers as they transition to online learning may sound like a seamless plan, but the actual implementation of these changes could never truly replace in-person learning.

### 2.2.3 Children and Parent Reactions to Suspending Classes Without Stopping Learning

In a national study conducted in 2021, researchers in China surveyed 28,334 children (age 6-8 years) and their parents on how the implementation of SCWSL affected them. The families came from all parts of China and with all different backgrounds, but the results from each region had few differences. Overall, about 85% of families reported that online learning had a worse effect on their child's education compared to in-person learning (Zhu, Liu, & Hong, 2021). Many students said they felt "fatigued" or "exhausted" from looking at a screen all day

(see Table 2). Many of these problems are caused by the previously discussed downsides of different online learning methods.

| Theme | Third-level codes | Second-level codes | First-level codes |
|---|---|---|---|
| Children's explanations | Personal related factors | Living habits | Physical exercising |
| | | | Sleep time |
| | | Adapting to online learning | Adapting to new learning facilities |
| | | | Adapting to new learning style |
| | Family related factors | Parental involvement | Parental supervision of learning |
| | | | Extra homework comes from parents |
| | | Network equipment at home | Internet speed |
| | | | Learning facilities |
| | School related factors | Teacher-children interaction | Interaction time with teachers |
| | | | Interaction ways with teachers |
| | | Peer interaction | Interaction time with classmates |
| | | | Interaction ways with classmates |
| Parents' explanations | Child related factors | Parental involvement | Accompany the children |
| | | | Instruct homework |
| | | Parent-children interaction | Parent-child conflict |
| | Personal related factors | Personal time allocation | Less work time |
| | | | Less rest time |

Table 2: A table from a national study showing how they coded children's and parents' qualitative comments about SCWSL

A large problem that the study focused on was the parental role of online learning. Since the children were stuck learning at home, their parents spent a lot of time watching over them. One child reported, "I don't want to have classes at home every day because my mother always sits next to me" (Zhu, Liu, & Hong, 2021). One mother noted, "The child is so little that at least one parent needs to be involved in online education, and it is frustrating instructing your child every day." (Zhu, Liu, & Hong, 2021).

These reports and statistics show that online education is significantly less effective than in-person learning and puts a large burden on both the parents and children. Our research aims to further investigate these issues and find ways for kindergartens to help both students and parents' transition back to traditional in-person learning.

## 2.3 The Pandemic's Impact on Childhood Development

The transition to online learning during the pandemic had consequences primarily stemming from the effect on their mental health due to isolation. A study conducted by Xiang et al. (2022) surveying 2,423 children and adolescents ages 6-14 explains how increased screen time during the pandemic has amplified mental health issues such as social anxiety and a decline in physical activity. The latter result correlates with a study done by Zeng et al. (2017) where they reviewed various literature pertaining to the effects of physical activity on cognitive development. Their study found that a decline in physical activity results in a decline in cognitive development. A hinderance to social and physical development can have consequences on academic performance in young children who still must learn such skills.

With the COVID-19 pandemic came a multitude of social shifts to prevent the spread of the virus such as the advocacy of social distancing and stay-at-home mandates. These shifts deprived children of both social and cognitive stimulation (Yoshikawa et al., 2020). Xiang et al. (2022) offers some validity to this correlation as their study focused on increased screen time during the pandemic by asking about children's physical activity level, screen time, and mental health. Their results indicated that 30.9% of the children that were surveyed reported engaging in longer leisure screen times of more than 2 hours a day as opposed to less than 2 hours a day before the pandemic started (p. 5). Since lockdown procedures and stay-at-home mandates stayed for months after the pandemic was declared (with the time varying from nation to nation) there was an ample amount of time for children to increase their screen time effectively limiting the amount of social interaction they receive.

Along with a decrease in social stimulation, academic development is also at risk of being hindered. McClelland, Morrison, & Holmes (2000) explored the relationship between social skills (specifically work-related skills) and academic success by surveying 540 children using a behavioral scale to measure social skills and an academic test to measure academic performance. The results of this study found that children with poor work-related skills tended to have a lower academic performance as well as overall issues in a school environment (p. 324). As stated before, with the lockdown procedures from the pandemic children had less chance~~s~~ to develop social skills, such as work-related skills, during the pandemic.

With the improving state of the pandemic, schools are starting to return to in-person learning meaning children will have to readjust to a more social environment. This transition

seems challenging when considering younger children ages 0-6 whose crucial stages of development took place during the pandemic meaning that their performance and behavior in school will seem as if it is lacking.

Another factor to consider is children's physical development. Zeng et al. (2017) researched how physical activity influences motor skills development in children ages 4-6. They performed a meta-analysis of 15 studies that researched the effect of physical activity on motor and cognitive development. 80% of the studies they reviewed found that there is a positive relationship between physical activity and motor skills development along with cognitive development (Zeng et al., 2017, p. 9). Such a relationship can become a problem when looking back at a finding from Xiang et al (2022) where the amount of physically inactive students increased by 21.9% during the pandemic (p. 5). While the results from these studies do not explicitly state that an increase in physical inactivity causes a decline in motor skills and cognitive development, it can be reasonably inferred that the increase in physical inactivity during the pandemic caused delay in the development of children's motor skills.

## 2.4 Pandemic Setbacks and Future Plans

However, the pandemic has set back plans Chinese parents may have for their children's future education. Broad lockdowns and social isolation caused a decrease in employment leaving families with less income in the following years. This situation causes changes in parent plans because in China the family background of a child plays a significant role in transitioning and enrolling into schools. This situation is especially true if the pandemic affected the family's financial situation (Djundeva, Dykstra, & Emery, 2019). The higher the family status the better-quality resources for education that they have access to such as tutors or better textbooks. As a result, these students have superior grades and test scores.

This inequitable situation will become even more significant as the quality of education decreased during the span of the pandemic because of the Online Learning system. Since China is heavily based on test scores, students with higher socioeconomic background typically have an advantage to being admitted to more distinguished schools or universities. In the case of this study, it may cause a parent to choose a public school or kindergarten versus a more expensive private one that has a high-quality reputation. With the pandemic affecting each person in several different ways, there are many other factors that may have not been considered. China is unique

in the fact that they have very strict policies such as the zero covid policy and a different culture which creates differing social views and norms. These factors create a knowledge gap in understanding the parent's expectations for their children's education coming back from the pandemic. To bridge this gap, we will investigate these expectations in our next section.

# 3. Methods

The goal of this study was to provide recommendations to our sponsor's Montessori kindergarten on how to resolve the expectations given by parents by gathering information about how the pandemic specifically affected parental expectations for their children's future education in China. We initially developed the following research objectives to achieve this overarching goal:

1. Interview parents in China to learn what general expectations parents have for their children in relation to their education
2. Identify how the pandemic affected the parents and children in terms of economics, social life, and education, and how this change may have affected parental expectations for their child's education
3. Develop recommendations to the Montessori school by analyzing data trends of demographic and common parental expectations to determine what the school needs to better meet the expectations of the parents

This section includes an overview of the semi-structured pre-survey interviews, a broad-based structured survey, and finally some follow-up interviews. We will discuss the justification of each data collecting method and how it led us to answer our research questions and provide recommendations to help our sponsor improve. To make sure we could complete our data collection on time, our team created a Gantt chart, which can be found in Appendix A.

## 3.1 Semi-Structured Interviews with Parents

The definition of "what parents expect from their kids" is broad. There are several different categories of expectations, such as educational, social, and developmental. Focusing on every single type of expectation will lead to a messy, unspecific conclusion that will not be helpful to our sponsor. Since we are sponsored by a children's kindergarten, we wanted to specifically focus on expectations pertaining to a younger child's education. From our background research, we concluded that an emphasis on developmental skills gained during this early academic period was the most important to investigate. We met with our sponsor several times during this project to clarify our goals and methods. However, our background information was based on a research point of view, rather than viewpoints from actual parents. The parent

view on the subject provides insight to our sponsor about how to market their school to prospective parents. To get a better grasp of which parental expectations were the most important we used interview data collected by the HDU student group.

The interview questions were created based off our background research with our overall goal in mind. An English copy of our interview questions can be found in Appendix B. We sent our questions to the HDU team, who were able to interview three parents in China. The interview transcripts were translated to English and the most common answers were used to influence our survey questions.

## 3.2 Large Scale Survey with Parents

Using the information from our secondary research background and interviews from HDU, we formulated survey questions to be distributed to a larger group of parents in the United States. Parallel to our survey, the HDU team formulated their own survey to distribute to parents in China. The purpose of these surveys was to identify how the pandemic affected parents on a large scale. Our surveys were not the exact same due to cultural differences and having separate background research and project goals, but we included the most important questions from each other's surveys in both. Our final survey questions can be found in Appendix C. The survey conducted by the HDU team can be found in Appendix D.

The survey was conducted using Qualtrics, an online surveying service. We distributed our survey using personal connections, such as sending it out to WPI faculty. We also reached out to parent Facebook groups to find participants and created a flyer, shown in Appendix E, to post around local community buildings. Our goal was to get 100 survey participants because it is roughly the number of children who attend our sponsor's school and provides a significant size sample to run and evaluate various statistics. To reach our goal, we used Amazon's Mechanical Turk to further distribute our survey.

### 3.2.1 Justification of Survey Questions

All questions in our survey were thoughtfully added to be useful to our sponsor, while also being quick and simple for survey participants. Many questions use a Likert-type scale answer format to make data analysis easier. This section will explain the reasoning behind major survey questions.

### 3.2.2 Demographic Questions

The demographic questions gather information that may have an impact on a child's home life and education. Data gathered from these questions include household income, parent's level of education, and the child's age. These demographics are used to compare various survey results across different groups. This method of data analysis will be further explained in our results section. We included a question asking the age of the participant's youngest child, which has an option as "8+". Since the target demographic of our study was parents with children ages 0-6, we used this question to filter out responses that did not fit our demographic. We chose eight years as our cutoff rather than seven because the child may have very recently turned seven, therefore the parent's input may still be helpful.

### 3.2.3 Learning Delivery Effectiveness

A question asks if the participant's child attended online learning during the pandemic. If they answered yes, a follow up question asks, "How would you compare the effectiveness of online learning versus traditional in-person learning?", followed by a Likert scale ranging from "Much worse" to "Much better". This question is used to confirm the purpose of our project. Based on our background research, we hypothesized that there will be a negative response to this question.

### 3.2.4 Pandemic Impact on Developmental Skills

To determine parent perceptions of the pandemic on developmental skills a series of questions in response to "How would you rate the pandemic's effect on your child's development of the following skills?" was asked, followed by a list of developmental milestones, each with their own Likert-type scale. The developmental milestones were chosen based on our background research (see Section 2.1). The results of this question will be used to rank the milestones by importance and prioritize developmental skills needing the most attention.

### 3.2.5 Pandemic Impact on Home Life

To determine how the pandemic affected home life we asked the question: "How would you rate the pandemics' effects on the following aspects of home life?".

Four specific aspects were related to this general question; parent-child relationship, free time, stress, and income - each aspect had a separate Likert-scale response. The inclusion of these home-life aspects is supported from our background research (see Table 2).

The “Income” aspect was informed by interviews conducted by the HDU student team, which were then translated to English. When asked about the pandemic’s effect on family life, one woman stated, “I was one of the many layoffs due to the spread of the epidemic, which reduced my family's income by half and increased the pressure to spend money.” The results of this question give us a better understanding of the children’s learning environment during the pandemic.

### 3.2.6 Parents on School Improvements

The next set of questions focuses on future improvements parents would like to see in schools. This question set is one of the more important questions in our survey and directly relates to project and sponsor goals. The question asks: “Following the COVID-19 pandemic, what areas of learning would you want schools to place more emphasis on?”. This general question was followed by a list of specific learning aspects with Likert-type response scales. The different learning aspects include Increased health protocol, Group learning, Self-guided learning, Communication skills, Reading and math skills, Recreational time, Independence, Creativity, and Hobbies.

While we did not plan to specifically ask about Montessori schools, this question is heavily influenced by the main Montessori learning ideals such as self-guided learning. The learning aspects were found through our background research. Additionally, the interviews conducted by the HDU team provided additional learning aspects to include in the questionnaire. Initially, we anticipated parents in China to be very controlling of their children’s futures, from what our sponsor has informed us as well as our background research. However, when asked about their plans for their child’s future, one parent said, “Both [my child]'s mom and I think it would be better to let the kid find his own direction of interest, and it's still up to him to figure out what he wants to do in the future.” From this response and the other interview responses, we added more learning aspects to the questionnaire, specifically “Creativity”, “Hobbies”, and “Independence” learning aspects were included.

### 3.2.7 Open-Ended Question

The final question in the survey instrument is a free-response question asking parents if there are any other concerns about the pandemic and its effects. This space is intended for any further comments on topics we may have missed. It also provides for qualitative evaluation of the responses.

### 3.3 Follow-up Interviews

At the end of our survey, we asked participants if they were interested in a follow-up interview to further talk about their answers. The interviews were held over Zoom and were recorded with the participant's consent.

The purpose of these interviews was to elaborate further on the reasoning behind each participant's choice of answer to gain a deeper understanding of our goals. Each set of interview questions was created based off the individual's survey results but followed the same general format. For example, if a participant said they wanted more emphasis on group learning, we asked how they think schools can help with that. The results of the interviews will be discussed in later sections. An example of these interview questions can be found in Appendix F.

To ensure we received helpful information from the interviews, we created an interview protocol. During each interview, all three team members sat at the same table, and each joined the Zoom call with cameras on. The main speaker would unmute themselves and turn on their laptop's volume while the other two members remained muted, so the call did not echo. By being physically in the same room, the team members were able to fluidly continue the conversation and make sure we stayed on topic. The main speaker would conduct the interview and the secondary speaker would provide any further comments or questions they could think of. The third member recorded the call and typed notes.

## 4. Findings and Analysis

As previously stated, the goal of this project is to provide recommendations to our sponsor based on how the pandemic has affected childhood education. We also wanted to research how the pandemic affected parental expectations and plans for their children since our sponsor brought up the idea that the pandemic could have shifted expectations. In this section, we will highlight the results and analysis of the surveys and interviews conducted by both the WPI and HDU teams.

### 4.1 Survey Results

We collected survey results from 50 participants in the U.S and 118 from HDU surveying parents in China, giving us a total of 168 participants. From the U.S. surveys, we had four follow-up interviews. The demographic information of the U.S. surveys—see Table 3—included

distribution of parent income, number of children they have, and type of education their child is enrolled in.

Along with the demographics, we collected means and standard deviations of survey questions 16-18. Each question had a Likert-scale of five choices which included a scale from 1-5 when looking at the data to calculate averages (see Appendix C for the specific choices for each question). For all questions with Likert scale answers, a value of 1 represented a very negative effect, 3 represented no effect, and 5 represented a very positive effect. For question 18 a score of 1 means much less, 3 means no change, and 5 means much more.

| Demographic Category | Frequency | Percent |
|---|---|---|
| *Age* | | |
| 25-34 | 13 | 26.00% |
| 35-44 | 33 | 66.00% |
| 45-54 | 3 | 6.00% |
| 55-64 | 1 | 2.00% |
| *Gender* | | |
| Male | 14 | 28.00% |
| Female | 36 | 72.00% |
| *Ethnicity* | | |
| White or Caucasian | 38 | 73.08% |
| Black or African American | 1 | 1.92% |
| Asian | 7 | 13.46% |
| Latino or Hispanic | 3 | 5.77% |
| Native Hawaiian or Pacific Islander | 1 | 1.92% |
| Other | 2 | 3.85% |
| *Education* | | |
| High School Diploma or equivalent | 1 | 2.00% |
| Some college but no degree | 3 | 6.00% |
| Associate Degree | 3 | 6.00% |
| Bachelor's Degree | 16 | 32.00% |
| Master's Degree | 16 | 32.00% |
| Doctoral Degree | 10 | 20.00% |
| Professional Degree | 1 | 2.00% |
| *Worked remotely during the pandemic* | | |
| Yes | 29 | 58.00% |
| No | 21 | 42.00% |
| *Yearly household income* | | |
| Less than 35,000 | 1 | 2.00% |
| 35,000 - 69,999 | 9 | 18.00% |
| 70,000 - 149,999 | 18 | 36.00% |
| 150,000 - 250,000 | 14 | 28.00% |

| | | |
|---|---|---|
| More than 250,000 | 6 | 12.00% |
| Prefer not to answer | 2 | 4.00% |
| | | |
| *Relationship to child(ren)* | | |
| Mother | 35 | 70.00% |
| Father | 15 | 30.00% |
| | | |
| *Age of youngest child* | | |
| 0-2 | 22 | 44.00% |
| 3-4 | 15 | 30.00% |
| 5-7 | 13 | 26.00% |
| | | |
| *Child's current education* | | |
| Public | 25 | 50.00% |
| Private | 15 | 30.00% |
| Montessori | 3 | 6.00% |
| Home-Schooled | 2 | 4.00% |
| Other | 5 | 10.00% |

Table 3: Demographic Questions from U.S. Survey Data

Using the demographic information from our survey data (see Table 3) we specifically focused on sorting and analyzing the survey data by age of their youngest child, type of education their child is enrolled in, whether the parent worked remotely and whether the child participated in online learning because these were the demographics that we hypothesized would have differences in responses. To compare the differences between the demographics, we conducted an unequal variance T-test for online learning (see Tables 4-6), working remotely (see Tables 7-9), and education of the child (see Tables 10-12). We performed an unequal variance test because the demographics were not all evenly split into two groups. For the results of the T-test, a higher value means a greater difference between the two samples. We also calculated the p-value to determine statistical significance where a p-value of 0.05 or lower was statistically significant.

Though our background research outlines how negative online learning was perceived and the detriments it could have to early childhood development, From Table 4 we can see that the effect on children's development was relatively similar regardless of whether children participated in online learning or not. The only value that was close to 0.05 was the effect on physical fitness with a value of 0.11 but it is not nearly close enough to 0.05 to show a meaningful difference.

| *How would you rate the pandemic's effect on the following development skills?* | Mean (online) | Standard deviation (online) | Variance (online) | Mean (in-person) | Standard Deviation (in-person) | Variance (in-person) | T-Value | p-Value |
|---|---|---|---|---|---|---|---|---|
| Social interaction | 2.17 | 0.71 | 0.5 | 2.28 | 0.62 | 0.39 | 0.57 | 0.57 |
| Motor skills | 2.72 | 0.75 | 0.57 | 2.81 | 0.6 | 0.36 | 0.44 | 0.66 |
| Cognitive learning | 2.5 | 0.71 | 0.5 | 2.69 | 0.63 | 0.4 | 0.93 | 0.36 |
| Emotional skills | 2.22 | 0.88 | 0.77 | 2.44 | 0.76 | 0.58 | 0.87 | 0.39 |
| Physical fitness | 2.5 | 0.99 | 0.97 | 2.94 | 0.75 | 0.56 | 1.64 | 0.11 |

Table 4: Pandemic's effect on developmental skills between children who did and did not participate in online learning

Much like childhood development, the effects on home life were similar between the two except for stress (with a p value of about 0.05) as seen in Table 5. According to our results, stress was better for parents with kids who were online with a mean of 2.67 compared to a mean of 2.03 from those with children who were in-person. This result was unexpected since all of our interview participants stated that they had difficulties managing their child who participated in online learning while trying to manage their home life. However, this split does not consider the ages of the child so those that did answer "no" to our online learning question may have had children who were either newborns or infants. Furthermore, we asked for the age of their youngest child but there were parents who had multiple children so they could have had their older child participate in online learning.

| *How would you rate the pandemics' effects on the following aspects of home life?* | Mean (online) | Standard deviation (online) | Variance (online) | Mean (in-person) | Standard Deviation (in-person) | Variance (in-person) | T-Value | p-Value |
|---|---|---|---|---|---|---|---|---|
| Parent-child relationship | 3.33 | 0.97 | 0.94 | 3.13 | 1.19 | 1.42 | 0.67 | 0.51 |
| Free time | 3.11 | 1.28 | 1.63 | 3 | 1.37 | 1.87 | 0.29 | 0.77 |
| Stress | 2.67 | 1.14 | 1.29 | 2.03 | 0.97 | 0.93 | 1.99 | 0.05 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Total household income | 2.89 | 0.83 | 0.69 | 3 | 0.62 | 0.39 | 0.49 | 0.63 |

Table 5: Pandemic's effect on home life between parents of children who did and did not participate in online learning

When looking at what parents want from schools, the results validate our background research about online learning, specifically how frustrating it was for parents to have to sit with their child throughout most of their online learning experience. In Table 6, we can see that parents with children who participated in online learning wanted the greatest emphasis on independence since that aspect had the highest mean value of 4.39. This was also the aspect that had the greatest difference between the two samples with a T-value of 3.34 and a p-value of 0.002. The second highest mean value for the online learning group was creativity which relates to independence as in all of our interviews, parents would discuss how they want their children to express themselves however they would like to and find their own interests. This question showed the greatest number of differences between parents. Self-guided learning, reading skills, math skills, independence, and creativity each showed statistically significant differences between parents that had children on-line versus those that did not. In each case parents on-line wanted greater emphasis in each of these areas of learning.

| *Following the COVID-19 pandemic, what areas of learning would you want schools to place more emphasis on?* | Mean (online) | Standard deviation (online) | Variance (online) | Mean (in-person) | Standard Deviation (in-person) | Variance (in-person) | T-Value | p-Value |
|---|---|---|---|---|---|---|---|---|
| Increased health protocol | 3.61 | 0.85 | 0.72 | 3.47 | 0.76 | 0.58 | 0.59 | 0.56 |
| Group learning | 3.61 | 0.65 | 0.43 | 3.34 | 0.72 | 0.52 | 1.34 | 0.19 |
| Self-guided learning | 3.5 | 0.97 | 0.94 | 2.88 | 0.99 | 0.99 | 2.17 | 0.04 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Communication skills | 3.94 | 0.56 | 0.32 | 3.84 | 0.85 | 0.72 | 0.5 | 0.62 |
| Reading skills | 3.94 | 0.8 | 0.64 | 3.38 | 0.67 | 0.46 | 2.55 | 0.02 |
| Math skills | 3.94 | 0.87 | 0.76 | 3.38 | 0.67 | 0.46 | 2.4 | 0.02 |
| Recreation | 3.83 | 0.86 | 0.74 | 3.72 | 0.81 | 0.66 | 0.46 | 0.65 |
| Independence | 4.39 | 0.61 | 0.37 | 3.75 | 0.71 | 0.51 | 3.34 | 0.002 |
| Creativity | 4.33 | 0.69 | 0.47 | 3.94 | 0.76 | 0.58 | 1.88 | 0.07 |
| Hobbies | 3.78 | 0.81 | 0.65 | 3.59 | 0.71 | 0.51 | 0.81 | 0.43 |

Table 6: Areas parents want schools to emphasize between parents of children that did and did not participate in online learning

Within the parents who worked remotely versus those who did not, the survey results shown in Table 7 were not too different as indicated by the fact that the T-values are generally below one and the p-values are greater than 0.05 (or 0.10, if we wished to be a little more liberal in statistical significance level). The only difference between parents that worked remotely or not is for motor skills with a p-value of 0.02 where parents who worked in-person had a mean of 2.52 while parents who worked remotely had a mean of 2.97. This could correlate to the results shown in Table 8 where the aspect of home life with the highest T-value difference and lowest p-value is free time. Our data from follow-up interviews agree that the parents who worked remotely would have more free time by nature of not having to commute to work, which allows them to spend more time with their children therefore allowing more emphasis on development. Though the p-values for the rest of the developmental skills are above 0.05, the mean values are higher for parents who worked remotely except for social interaction where the mean values are the same between the two demographic groups.

| *How would you rate the pandemic's effect on the following development skills?* | Mean (in-person) | Standard deviation (in-person) | Variance (in-person) | Mean (remote) | Standard Deviation (remote) | Variance (remote) | T-Value | p-value |
|---|---|---|---|---|---|---|---|---|
| Social interaction | 2.24 | 0.66 | 0.44 | 2.24 | 0.66 | 0.44 | 0.02 | 0.99 |
| Motor skills | 2.52 | 0.67 | 0.44 | 2.97 | 0.6 | 0.36 | 2.41 | 0.02 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cognitive learning | 2.52 | 0.67 | 0.44 | 2.69 | 0.68 | 0.46 | 0.86 | 0.39 |
| Emotional skills | 2.19 | 0.72 | 0.52 | 2.48 | 0.87 | 0.75 | 1.3 | 0.2 |
| Physical fitness | 2.71 | 0.72 | 0.51 | 2.83 | 0.97 | 0.94 | 0.48 | 0.64 |

Table 7: Pandemic's effect on developmental skills between children with parents who worked remotely vs. those who did not

| *How would you rate the pandemics' effects on the following aspects of home life?* | Mean (in-person) | Standard deviation (in-person) | Variance (in-person) | Mean (remote) | Standard Deviation (remote) | Variance (remote) | T-Value | p-Value |
|---|---|---|---|---|---|---|---|---|
| Parent-child relationship | 3.1 | 1.04 | 1.09 | 3.28 | 1.14 | 1.3 | 0.58 | 0.56 |
| Free time | 2.71 | 1.1 | 1.21 | 3.28 | 1.44 | 2.06 | 1.56 | 0.12 |
| Stress | 2.29 | 1.06 | 1.11 | 2.24 | 1.09 | 1.19 | 0.14 | 0.89 |
| Total household income | 2.86 | 0.79 | 0.63 | 3.03 | 0.63 | 0.39 | 0.85 | 0.4 |

Table 8: Pandemic's effect on home life between parents who worked in-person vs. Remotely

With areas of learning shown in Table 9, the only statistically significant value was for hobbies with a p-value of 0.02. It is worth noting that even though self-guided learning had a p-value of 0.08 which is greater than 0.05, it is lower than the rest of the p-values for this table. This may be because parents who worked remotely were able to be more involved with their child overall, especially since these children are in the early stages of life so they would need a lot of guidance. As a result, parents may desire for their child to be more independent after having been so involved with their child's education and development which is a sentiment that some of our interview participants shared.

| *Following the COVID-19 pandemic, what areas of learning would you want schools to place more emphasis on?* | Mean (in-person) | Standard deviation (in-person) | Variance (in-person) | Mean (remote) | Standard Deviation (remote) | Variance (remote) | T-Value | p-Value |
|---|---|---|---|---|---|---|---|---|
| Increased health protocol | 3.38 | 0.8 | 0.65 | 3.62 | 0.78 | 0.6 | 1.06 | 0.3 |
| Group learning | 3.33 | 0.73 | 0.53 | 3.52 | 0.67 | 0.45 | 0.91 | 0.37 |
| Self-guided learning | 2.76 | 1.01 | 1.03 | 3.28 | 0.98 | 0.96 | 1.8 | 0.08 |
| Communication skills | 3.9 | 0.89 | 0.79 | 3.86 | 0.67 | 0.45 | 0.19 | 0.85 |
| Reading skills | 3.52 | 0.68 | 0.46 | 3.62 | 0.8 | 0.63 | 0.46 | 0.65 |
| Math skills | 3.62 | 0.67 | 0.45 | 3.55 | 0.86 | 0.73 | 0.31 | 0.76 |
| Recreation | 3.81 | 0.87 | 0.76 | 3.72 | 0.8 | 0.64 | 0.36 | 0.73 |
| Independence | 4.05 | 0.67 | 0.45 | 3.93 | 0.77 | 0.59 | 0.57 | 0.57 |
| Creativity | 4.24 | 0.7 | 0.49 | 3.97 | 0.78 | 0.61 | 1.3 | 0.2 |
| Hobbies | 3.95 | 0.74 | 0.55 | 3.45 | 0.69 | 0.47 | 2.45 | 0.02 |

Table 9: Areas parents want schools to emphasize between children of parents who worked in-person vs. remotely

When comparing parents of public vs. private school children, there were not many statistically significant differences much like the comparison between parents who worked in-person vs. remotely. From Table 10 we can see that the only significant difference in development cognitive learning with a p-value of 0.05. However, we do not have any research or evidence that explains this difference.

| *How would you rate the pandemic's effect on the following* | Mean (public) | Standard deviation (public) | Variance (public) | Mean (private) | Standard Deviation (private) | Variance (private) | T-Value | p-value |
|---|---|---|---|---|---|---|---|---|

| *development skills?* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Social interaction | 2.32 | 0.63 | 0.39 | 1.94 | 0.74 | 0.55 | 1.74 | 0.09 |
| Motor skills | 2.92 | 0.76 | 0.58 | 2.56 | 0.66 | 0.43 | 1.68 | 0.1 |
| Cognitive learning | 2.76 | 0.78 | 0.61 | 2.33 | 0.65 | 0.42 | 1.96 | 0.05 |
| Emotional skills | 2.36 | 0.91 | 0.82 | 2.17 | 0.81 | 0.65 | 0.73 | 0.47 |
| Physical fitness | 2.88 | 0.83 | 0.69 | 2.61 | 1.07 | 1.14 | 0.89 | 0.38 |

Table 10: A comparison of the pandemic's effect on developmental skills between children in public school vs. private school

In Table 11 we can see the same trend for the effect on home life between both demographics where none of the p-values are 0.05 or below. These results have another instance of a p-value that is close to 0.05 which is total household income at 0.08, but choice of school is not solely based on income.

| *How would you rate the pandemics' effects on the following aspects of home life?* | Mean (public) | Standard deviation (public) | Variance (public) | Mean (private) | Standard Deviation (private) | Variance (private) | T-Value | p-Value |
|---|---|---|---|---|---|---|---|---|
| Parent-child relationship | 3.04 | 1.14 | 1.29 | 3.44 | 0.99 | 0.98 | 1.24 | 0.22 |
| Free time | 2.84 | 1.28 | 1.64 | 3.28 | 1.41 | 1.98 | 1.05 | 0.3 |
| Stress | 2.28 | 1.17 | 1.38 | 2.06 | 0.87 | 0.76 | 0.72 | 0.48 |
| Total household income | 2.76 | 0.78 | 0.61 | 3.11 | 0.47 | 0.22 | 1.83 | 0.07 |

Table 11: Pandemic's effect on home life between parents of children in public vs. private schools

Much like the previous two tables, Table 12 shows no significant differences in what areas of learning parents want more emphasis on between the two demographic groups. The two lowest p-values were increased health protocol and communication skills which were both 0.09 but are not less than or equal to 0.05 so they are not significant enough to show a difference. It is important to note that to have a more even split between the two demographics, we combined the private school responses with the Montessori responses since we decided that those have similar fundamentals in their independence of how they teach.

| *Following the COVID-19 pandemic, what areas of learning would you want schools to place more emphasis on?* | Mean (public) | Standard deviation (public) | Variance (public) | Mean (private) | Standard Deviation (private) | Variance (private) | T-Value | p-Value |
|---|---|---|---|---|---|---|---|---|
| Increased health protocol | 3.36 | 0.86 | 0.74 | 3.78 | 0.73 | 0.54 | 1.71 | 0.09 |
| Group learning | 3.4 | 0.66 | 0.46 | 3.56 | 0.83 | 0.69 | 0.66 | 0.51 |
| Self-guided learning | 2.96 | 1.05 | 1.11 | 3.22 | 1.2 | 1.43 | 0.74 | 0.46 |
| Communication skills | 3.72 | 0.68 | 0.47 | 4.11 | 0.76 | 0.58 | 1.74 | 0.09 |
| Reading skills | 3.76 | 0.83 | 0.69 | 3.56 | 0.68 | 0.46 | 0.89 | 0.38 |
| Math skills | 3.8 | 0.82 | 0.67 | 3.5 | 0.78 | 0.6 | 1.22 | 0.22 |
| Recreation | 3.96 | 0.89 | 0.79 | 3.61 | 0.78 | 0.6 | 1.37 | 0.18 |
| Independence | 4.2 | 0.65 | 0.42 | 3.94 | 0.74 | 0.55 | 1.17 | 0.25 |
| Creativity | 4.32 | 0.63 | 0.39 | 3.94 | 0.8 | 0.64 | 1.65 | 0.11 |
| Hobbies | 3.84 | 0.85 | 0.72 | 3.56 | 0.62 | 0.38 | 1.27 | 0.21 |

Table 12: Areas parents want schools to emphasize between parents of children in public vs. private schools

## 4.2 Effects of the Pandemic on Child Development and Home Life

This section will discuss the answer to our first research question, "How has the pandemic shifted parental expectations for their children" along with the effects of the pandemic on childhood development and home life. From our background research, we noticed a largely negative effect on children's development due to the pandemic, meaning we expected to see the same trend within our survey. However, the result was slightly different from what we expected because not all the categories we laid out were largely affected (see Table 13).

| *How would you rate the pandemic's effect on your child's development of the following skills?* | Mean | Standard deviation | Variance |
|---|---|---|---|
| Social interaction | 2.24 | 0.66 | 0.43 |
| Motor skills | 2.78 | 0.66 | 0.43 |
| Cognitive learning | 2.62 | 0.67 | 0.45 |
| Emotional skills | 2.36 | 0.81 | 0.66 |
| Physical fitness | 2.78 | 0.87 | 0.75 |

Table 13: Pandemics effect on developmental skills

According to our survey results, the lowest scores, meaning the aspects that were negatively affected the most, were social interaction and emotional skills with mean values of 2.26 and 2.38 respectively. For reference, a value of one represents the largest negative effect, a value of three represents no effect, and a value of five represents the largest positive effect. Although the rest of the aspects had a mean value of less than three, they were quite close to three, meaning that the pandemic had a small effect on motor skills, cognitive learning, and physical fitness. A reason for this could be that most of the parents who took our survey reported that their youngest child was either 0-2 or 3-4 (22 reported that their child was 0-2 and 15 reported that their child was 3-4). Children aged 0-2 are quite young meaning that those children were born after the pandemic started and maybe even when the state of the pandemic started to calm down. When following up with one of the participants for more insight, they stated, "I think that she [the participant's child] was in the sweet spot. She wasn't starting kindergarten when the pandemic started, she wasn't an infant. she could still go to daycare and was still around other kids." Furthermore, most of our survey participants reported that their child did not participate in online learning as shown in Table 14.

| *Did your child participate in online learning?* | Frequency | Percent |
|---|---|---|
| Yes | 18 | 36.00% |

| | | | |
|---|---|---|---|
| No | | 32 | 64.00% |
| *How would you compare the effectiveness of online learning versus traditional in-person learning?* | Mean | Standard deviation | Variance |
| | 1.78 | 0.79 | 0.56 |

Table 14: Effects of online learning

Along with the negative effect on children's development, our background research showed that the pandemic had adverse effects on home life. The specific ones we asked about were parent-child relationship, free time, stress, and total household income shown in Table 15. The aspect that was affected the most was stress with a mean value of 2.26, which is confirmed by our background research. The other aspects have mean values close to 3, which appears at first unusual given the early stages of the pandemic but starts to make more sense when considering the demographic information of our survey.

| *How would you rate the pandemics' effects on the following aspects of home life?* | Mean | Standard deviation | Variance |
|---|---|---|---|
| Parent-child relationship | 3.2 | 1.10 | 1.21 |
| Free time | 3.04 | 1.32 | 1.75 |
| Stress | 2.26 | 1.07 | 1.14 |
| Total household income | 2.96 | 0.70 | 0.49 |

Table 15: Pandemics effect on home life

We had 29 participants report that they worked remotely during the pandemic as well as all our interview participants report that working remotely allowed them more time to interact with their children. As a result, the pandemic would have little to no negative effect on parent-child relationships and may have even strengthened them for some groups. It is also important to note that the variance for the first three aspects is quite high as well as the standard deviation, so the participants had varying home-life experiences during the pandemic.

To answer our research question, we initially had the HDU team ask parents what plans they had for their children in their interviews. HDU sent us four interview transcripts where three participants reported that they did not have any major plans for their children other than allowing them to explore their own interests rather than forcing them to pursue a certain goal. One participant stated that they would like their child to get into a good university, which is a sentiment that most parents share. As stated before, in Question 18 we added the categories

"Independence", "Hobbies", and "Creativity" based on the answers to this question to see how many parents agreed with this idea (see Table 16).

| *Following the COVID-19 pandemic, what areas of learning would you want schools to place more emphasis on?* | Mean | Standard deviation | Variance |
|---|---|---|---|
| Increased health protocol | 3.52 | 0.79 | 0.62 |
| Group learning | 3.44 | 0.71 | 0.5 |
| Self-guided learning | 3.10 | 1.03 | 1.07 |
| Communication skills | 3.88 | 0.76 | 0.57 |
| Reading skills | 3.58 | 0.75 | 0.55 |
| Math skills | 3.58 | 0.77 | 0.6 |
| Recreational time | 3.76 | 0.82 | 0.68 |
| Independence | 3.98 | 0.72 | 0.51 |
| Creativity | 4.06 | 0.75 | 0.56 |
| Hobbies | 3.66 | 0.74 | 0.56 |

Table 16: Areas of learning parents want schools to place more emphasis

Based on our results, independence, creativity, and hobbies were within the top five in terms of their mean values of 3.98, 4.06, and 3.66 respectively with creativity ranking the highest. From these results along with our interview data, which will be explained in further detail later, we deduced that most parents want their children to explore their own interests. An important factor to consider for our survey data is that most of our participants had children who were between the ages of 0-4, meaning they either had their children during the pandemic or directly before, so we could infer that most parents did not have any major plans for their children.

## 4.3 Changes Parents Would Like to See in Post-Pandemic Schools

This section will discuss the answer to our second research question, "What changes to education would parents like to see in schools?". Initially, our team hypothesized group learning and communication skills to be the most important since those relate most directly to the lack of development highlighted in our background research. However, the results of this question show that the biggest priorities for parents are creativity, independence, communication skills, and recreational time with respective means of 4.06, 3.98, 3.88, and 3.76 (see Table 16). This was surprising to us because these three of the four answers stemmed from the pre-survey interviews and not from our background research. These aspects continued to appear in our follow-up interviews as well.

Most parents said schools need to spend less time on academics to allow more time for recreation. This can be seen comparing the means for academic standards such as math and reading to recreation time and hobbies (see Table 16) which in terms of means is 3.58 and 3.58 compared to 3.76 and 3.66. One parent even stated, “Kindergarteners five or seven years ago used to just learn to write. To do letters, identify numbers, sounds, maybe some sight words … But now in kindergarten, they’re doing that at an expedited rate so they can start reading”.

While learning letters and numbers are still important, kids still need to be kids during this early stage of development. When asked how schools can place more emphasis on creativity and hobbies, the same parent answered, “Offer it every day. [My child] gets an art period on Mondays, a tech period on Tuesdays, music on Wednesdays, and gym on Thursdays. Can we rope all those things, in some capacity, to every single day?”. The parent also went on to say their child’s recess is only 20 minutes long, which in their opinion was not long enough for their child to get all their energy out before returning to the classroom.

The least important aspect according to parents was self-guided learning, which also had the highest standard deviation of 1.03, leading us to believe that the aspect was not clearly defined. When we asked one parent why they wanted more independence but less self-guided learning, they explained how their child will sometimes come home with artwork that looks like pieces of paper glued together, and how the kindergarten likely gave their child a handful of supplies with zero instruction. This approach may have been how the parent interpreted self-guided learning. They went on to say they would like schools to start children off with some guidance, for instance how to start their art project, then let the children complete the project independently. For other parents, self-guided learning and independence may have similar meanings, leading them to check off more self-guided learning along with more independence. This large divide also shows up when we split our results by their demographics. As shown in Table 9, parents whose children did participate in online learning want more emphasis on self-guided learning while parents whose children did not participate in online learning wanted less emphasis on self-guided learning. However, every table still showed a high standard deviation, leading us to draw the same conclusion as previously explained.

Overall, our research can be concluded to say that parents want their kids to express themselves. They should not stress about grades or adulthood yet. Schools need to slow down their academic curriculum and focus more on the children’s interactions with the world. As one

parent put it, “I think potentially the pandemic and the shutdown was a realization that schools aren’t just teaching math, reading, science. They're also teaching children how to be community members. Have relationships with other people”.

## 4.4 Comparative analysis of HDU data

This section will analyze the data collected from China by our HDU cohort and make comparisons to the data collected in the U.S. The data from the U.S. provides us with a broader perspective of what happened during the pandemic; however, as stated before in the background China and the United States have very different situations and cultures. This leads to deviations in answers given by the parents.

One of the major questions we had was how the pandemic effect children’s development. By comparing the means from the data collected from the U.S. (see Table 13) and the data below from China (see Table 17), we can see they vastly differ from each other. While the U.S. has a negative correlation on how the pandemic effected their children’s development, the Chinese data has a high standard deviation meaning that there was differing evaluations from parents in China with their being slightly more parents having positive ones. While it is unknown what caused the pandemic to positive impact on more than half of the survey participants, we have made speculations and conjectures based on interview respondents from Yimi Montessori school and the HDU team.

| 第14题您如何评价疫情对您孩子以下技能发展的影响： [矩阵量表题]<br>*Question 14. How do you evaluate the impact of the pandemic on your child’s development:* | 平均分<br>Mean | Standard deviation | Variance |
|---|---|---|---|
| 社交互动 - Social interaction | 3.16 | 2.34 | 5.49 |
| 运动技能 - Motor skills | 3.22 | 2.36 | 5.60 |
| 认知学习 - Cognitive learning | 3.38 | 2.13 | 4.55 |
| 情感能力 - Emotional skills | 3.41 | 2.18 | 4.76 |
| 身体素质 - Physical fitness | 3.2 | 2.35 | 5.52 |
| 小计- Total | 3.27 | | |

Table 17: Pandemics effect on developmental skills in China

One reason would be while the pandemic was still in effect in China until recently, the Hangzhou area was overall not as affected unlike other areas in China. As said by one parent “The pandemic does not have any effect on Yimi kindergarten” and that they are “relatively safe

in Hangzhou at the moment, compared to the big cities.". This may be because the area did not close down schools often. Another parent stated, "Maybe we are not affected by the pandemic in Hangzhou because our kindergarten has not been closed for a day because of the pandemic" Since the school ran normally, no delays in development would occur.

Since the start of the pandemic, schools may have also started providing more learning tools and guides that families could use at home to help their children. For instance, even before the pandemic our sponsor told us the Yimi Montessori school held parent workshops; however, during the pandemic they hosted those workshops online. Now, they hold them in person and online with the ones online being recorded. This action means the workshops and other learning tools were made more accessible. These added tools may have helped parents with their kid's development hence the positive correlation (see Table 17).

While the data did have a positive correlation, it also had a large standard deviation greater than 2 for each measurement which means the parents had varied answers. This could be explained by differing family situations such as location and income. As certain regions in China would often shut down due to covid cases, one of the parents said that in their hometown located in Northeast China that "because of the pandemic this child has not been taught for two months since he went to school". So, if a child couldn't go to school for some time, then that may be one reason why there were differing answers.

Another reason is the pandemic hit China harder economically. As seen in Table 18, total household income had a mean of 2.28 reflecting a decrease since the pre-pandemic period. This is different from the data we collected from the U.S. where the total household income was relatively unchanged (see Table 15). Having less income could result in less educational resources available to certain families which could change participant's answers to the question as well.

| *How has your current total household income changed compared to the pre-pandemic period?* | Mean | Standard deviation | Variance |
|---|---|---|---|
| *1-Greatly decreased, 2-Decreased, 3-No change, 4-Increased, 5-Greatly increased* | 2.28 | 0.92 | 0.85 |

Table 18: Change in total household income in China

Income also may have an effect of what education families choose for their children. Our sponsor, Kathy Wei told us "In China, public schools cost around 400 RMB or around $60 a

month while private or Montessori schools are much more expensive and can be around $1500". This is a large difference in what families would have to pay and could affect their decision on private or public education.

Another note of difference is who takes care of the child in the U.S versus China. For most cases in the U.S. the parents are the ones who take care of the child (see Table 3) while in China a little more than 27% (see Table 19) of people taking the survey was not a parent which is almost one third of the data collected. In China, "many older family members are involved in their grandchildren's day-to-day upbringing due to respect elders are given in Chinese culture" (Jenkins, 2021). However, there are also others taking care of the child as there is a "practice of hiring a yuesao (月嫂), a postpartum nanny and cook" (Jenkins, 2021). As there are more people helping around the house it could mean that it helps with the children's development and family's home-life factors such as stress.

| *Relationship to child(ren)* | Frequency | Percent |
|---|---|---|
| 爸爸/妈妈 - Mother/Father | 86 | 72.88% |
| 爷爷/奶奶/外公/外婆 - Grandparents | 15 | 12.71 |
| 外公/外婆 - Other | 17 | 14.41% |
| 其他 -Total | 118 | |

Table 19: Relation to child (China)

Using Table 13 and Table 17, we also ranked the developmental skills from highest to lowest based on their means (see Table 20). There were some differences in ranking especially in motor skills, physical fitness, and emotional skills. Two of the lower rankings in China are motor skills and physical fitness being third and fourth respectively while in the U.S. these skills are tied for first. Emotional skills is also first in China while in the U.S. its ranked fourth. These differences may be explained by how the pandemic was handled such as in the U.S. parents might have let their kids go out more while in China, they let them stay inside more. Another situation being children in China may have had more help around the house making them able to discern emotions better. While there were differences in ranking, there was one similarity reflected in the ranking which was social interaction. This skill was the lowest for both U.S. and China meaning it was the most negatively affected by the pandemic. This could be due to quarantining situations and children being unable to interact with each other.

| *Ranking* | *China* | *U.S.* |
|---|---|---|
| 1 | Emotional skills | Motor skills & physical fitness |
| 2 | Cognitive learning | - |
| 3 | Motor skills | Cognitive learning |
| 4 | Physical fitness | Emotional skills |
| 5 | Social interaction | Social interaction |

Table 20: Ranking of means for pandemics effect on developmental skills

For the U.S. the aspects of learning that parents wanted schools to put emphasis on was independence and creativity. While the survey in the U.S. and the one in China were not the same, both had questions including independence in some form. Both in the data from the U.S. (see Table 16) and the data from China (see Table 21), this aspect had one of the highest rankings in mean. For the table set above independence was represented by parents want for the children to have more self-discipline. The second highest ranking for the data in China was the want children to be more involved in hands-on activities at school. This is an aspect of Montessori learning where kids explore and interact with their surroundings.

| *Education Model:*<br>*1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly agree* | Mean | Standard deviation | Variance |
|---|---|---|---|
| I take the kindergarten model of education more seriously | 4.47 | 0.70 | 0.49 |
| When I choose a school, I learn about the educational model of the kindergarten | 4.46 | 0.72 | 0.52 |
| I agree with the current model of education in schools | 4.27 | 0.82 | 0.68 |
| I understand the Montessori philosophy of education | 3.76 | 1.22 | 1.48 |
| I approve of children attending mixed-age education | 3.67 | 1.10 | 1.21 |
| I want my child to be more involved in hands-on activities at school | 4.53 | 0.70 | 0.49 |
| I want schools to develop self-discipline in children | 4.61 | 0.67 | 0.44 |

Table 21: Education model factors in China

Other factors that were considered in the survey provided by HDU was the type of teaching style incorporated in schools. Through ranking the means, we were able to analyze what teaching aspects Chinese families deem most important. The three highest means are an increase in exercise, more interactive parent-child activities, and less online devices (see Table 22). While more parent-child interaction seems to be a pattern between Chinese and U.S. parents, exercise was not an emphasis for U.S. parents.

Looking at the social development question from earlier (see Table 17) while all development measured were positive, physical stamina was the second lowest in ranking (see

Table 20) with a mean of 3.2. This could possibly account for the want of more exercise in schooling. As for parent-child interactions, some parents in the U.S. stated in interviews that during the pandemic they were able to stay at home which led them to being able to spend more time with their kids increasing their parent-child relationship.

| *Teaching Style:*<br>*1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly agree* | Mean | Standard deviation | Variance |
|---|---|---|---|
| I hope that the online mode of teaching can be adopted if necessary, during the epidemic | 3.98 | 0.98 | 0.96 |
| I don't want my child to be glued to an online classroom device for a long time | 4.27 | 0.89 | 0.80 |
| I think it's necessary to have a guardian with you when teaching online | 4.18 | 0.83 | 0.68 |
| I would like to take more interactive parent-child activities | 4.31 | 0.76 | 0.58 |
| I would like to ensure that my child had more time to exercise | 4.38 | 0.73 | 0.53 |
| I approve of the content and approach of online teaching | 3.84 | 0.96 | 0.92 |
| I want to make online homework easier for my kids | 4.02 | 0.87 | 0.79 |

Table 22: Teaching style factors

# 5. Recommendations and Conclusion

This section will discuss recommendations to our sponsor based off our research. We will also state limitations we faced when collecting data and point out any biases that might have affected our outcomes. This section will end with a conclusion statement to reflect on our overall experience and findings. The purpose of this section is to bring meaning to our data analysis and provide significant insight to our sponsor.

## 5.1 Recommendations

The main change parents want to see in schools is more recreational time. After spending the past few years under pandemic lockdowns, children need to explore the new world around them. As one parent put it, “I feel like sometimes we don’t need to rush kids into adulthood. We need to let them have fun and be children for a little bit longer”. The Montessori approach allows children to wander around the classroom, but they should also spend more time interacting with the outdoors. Kids should be able to run on the grass, hug the trees, and learn about nature. One parent categorized these as “jumpy places”; environments where kids can climb and discover their body’s abilities while also letting their energy out.

To counteract the increased time spent playing, many interviews agreed that kindergartens should slow down their academic curriculum. Out of the ten aspects of learning parents were surveyed on, an increased emphasis on reading and math skills placed sixth, meaning parents are more concerned about many other aspects, such as independence and creativity. The only demographic in which reading and math skills placed higher was the group of parents whose children participated in online learning, where they tied in third with communication skills. Our background research showed that online learning, which focused mostly on academic skills, was highly ineffective, so children who participated in it fell behind on these skills. This would logically cause parents of those children to want more emphasis on reading and math skills. Since our sponsor did not shut down during the pandemic, their demographic was not as negatively affected in reading and math Their parents may lean more towards the demographic that did not participate in online learning, which ranks reading and math skills very low in priority. We recommend schools adjust their curriculum to focus more on extracurricular activities, such as art, music, and interacting with their peers. These activities should be offered multiple times a week and children should choose to participate in activities that pique their interest.

Another change parents want to see is an increase in parent-child interactions. In interviews done in the U.S. many stated that due to the pandemic they got to spend more time with their children; therefore, having a positive impact on their parent-child relationship. An increase in parent-child activities was also the second highest out of seven that Chinese parents placed emphasis on in teaching styles factors. As such, we recommend schools have more parent involvement at both home and at school. These activities can include days when parents can come to the school to do activities with their child or having a guide sheet at home to promote more interaction between the two.

There were also differences between public and private children in terms of their families change in total household income. In the U.S. data parents who sent kids to public school had a more negative effect on their income due to the pandemic than parents who sent their children to private schools. There was also a negative effect on total household income for the Chinese data as well (note that we cannot differentiate between which parents were public and private in the Chinese data). We believe that this change in income will not affect parents choosing Montessori schools since there are other factors when parents choose schools.

## 5.2 Limitations and Challenges

One of the biggest limitations is we were unable to go to China ourselves. This led to a need for frequent communication with our HDU team and the sponsor to gather information in a timely manner. During the first half of our project our teams had a 12-hour time difference, leaving some messages unread for several hours. The WPI traveled overseas to Hawaii in the second half, shortening our time difference to only six hours. While this difference meant both teams were concurrently awake more often, we still often found ourselves waiting several hours for a response. Another big problem was the language barrier. Since no one in our group speaks Mandarin, we had to rely on the HDU members who knew English. We often needed to repeat ourselves during our meetings because the WPI team was speaking English too quickly.

In addition to this project, the HDU team also attended seven other college courses, while the WPI team had two accelerated courses in the first half and no additional courses in the second half. This meant the HDU team could not dedicate as much time to the project as the WPI team. However, they still worked hard and were able to keep up with WPI’s deadlines.

### 5.2.1 Pre-interview Surveys

Initially, we planned to conduct pre-survey interviews in the US alongside those in China. Since we were stationed in Hawaii, we spent several days calling local schools asking if they could help us get in contact with some parents who were willing to interview. Unfortunately, the schools either rejected us or did not respond quickly enough. Ultimately, we decided to skip the interviews in the US and focus fully on creating and distributing our survey. Luckily the HDU team was able to conduct some interviews using our interview questions, which greatly improved our survey.

### 5.2.2 Surveys

After failing to contact schools in Hawaii, our team reached out to personal connections for survey participants. Without these larger connections, our limited data set likely does not represent all parents in the US.

Once we sent out our survey to Facebook groups, we were immediately faced with spam entries. Over 40 entries in a single day were submitted, all with inconsistent answers. Our team spent several days filtering out these entries, but they did not stop there. To get more survey entries, we utilized Amazon's Mechanical Turk, an online service which pays participants to complete tasks. However, there was issues using the service because of a monthly credit limit that prevented us from posting our survey which delayed us another week. 24 hours after posting our survey, we received over 250 results, all of which were mostly spam. Once again, we spent several days combing through these results and only gained four usable entries.

The biggest obstacle in conducting our survey was we were unable to distribute to parents in China. This made the results of our survey lean toward many western ideals, which may not be as useful to our sponsor who is in China. Since the HDU team conducted a survey separate from ours, we were only able to put a few of our questions into their survey. The results from HDU's survey leaned in the opposite direction of ours, which we did not expect.

### 5.2.3 Follow-up Interviews

Out of the four interviews conducted, three of the participants were WPI faculty members. These participants were highly educated and work in the academic field, so their input may be from a teacher's perspective rather than a parent's perspective.

## 5.3 Conclusion

The goal of this project was to research and understand how the pandemic affected parental expectations of early childhood education to develop recommendations for our sponsor's kindergarten in China to adjust to these effects. Since our background research showed a negative effect on development and aspects of home life, we expected parents to report a large negative effect in our surveys. Although we did see a net negative effect from the pandemic, it was not as large as we expected. However, we were still able to create recommendations based on our survey and interview data to help them adjust to the consequences of the pandemic.

The main takeaway we found in surveys and interviews from both the HDU and WPI teams is that parents want less emphasis on academics and more emphasis on allowing kids to explore their own hobbies, interests and develop some form of independence early on. From our follow-up interviews specifically, we learned that this was a sentiment parents had even before the pandemic started which was intensified by the pandemic. As a result, our recommendations followed the theme of advocating for more creativity, recreational time, and independence.

During our meetings with our liaison Ms. Wei, we learned that Yimi Children's House places a great emphasis on the aforementioned areas of learning. From this, we have concluded that Yimi Children's House is on the right track and has a hopeful future with their teaching style.

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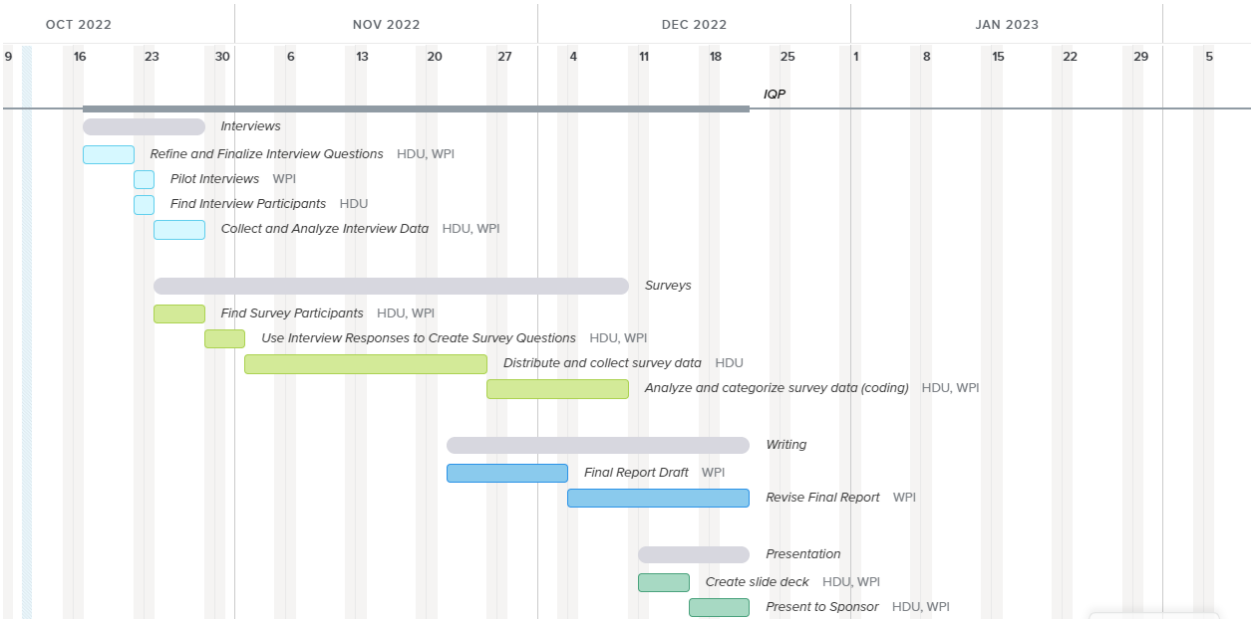
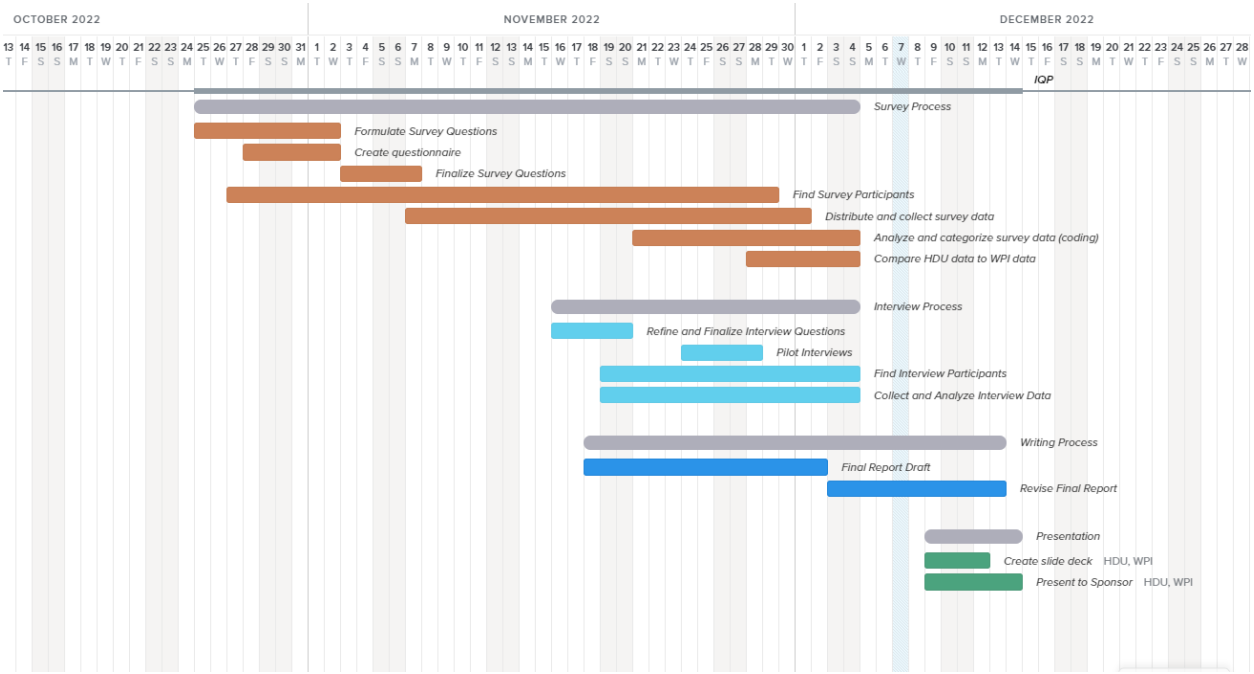
# Appendices

## Appendix A: Gantt Charts




Our preliminary Gantt chart




Our final Gantt chart

## Appendix B: Pre-survey Interview Questions

### Informed Consent

(Communicated verbally at the start of each interview)

We are a group of students from Worcester Polytechnic Institute in Massachusetts, and we are working with a kindergarten in China to find out how parental expectations for their children have changed due to events of the COVID-19 pandemic. Currently, we are conducting semi-structured interviews to get a grasp of what parents in China have planned for their child's educational future, and how those plans affect what kindergartens should teach. The qualitative answers from these interviews will be used to produce highly structured surveys to further research our topic.

Your participation in the interviews and surveys is completely voluntary, and you may withdraw at any time. You may choose to skip a question if you do not want to answer it. We ensure that your answers will remain confidential. All interviews will be recorded for reference but will not be distributed to anyone other than students and project advisors directly involved. No names or identifying information will appear on any of the questionnaires, project reports, or publications. The kindergarten will use this information as suggestions on how to improve their learning experience for children ages 0-6 in China.

### Interview Questions

Demographics:

1. What is your relation to your child(ren)?
2. How old is/are your child(ren)?
3. What is your current income?
4. What is your highest education level?
5. Number of children?
6. Are you a single parent?
7. Who else lives in the household?

Qualitative questions:

1. Did your child participate in online learning?
    a. Did you notice any issues that would otherwise not develop if they learned in-person?
    b. Did you have any issues with always having your child at home?

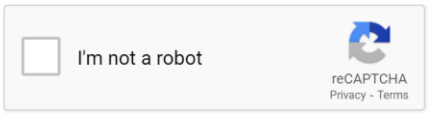
2. How has the pandemic affected you personally?
3. Have you noticed a delay in your child's development due to covid?
4. Did you have any future plans for your child's education?
    a. Have those plans changed due to covid? How so?
    b. Are there any skills you would like your child to learn? (For example, learning to speak English)?
5. Have you considered alternative forms of education other than the one your child/children are currently in? (For example, public school vs private school)
6. What change would you like to see schools make in order to adapt to the challenges caused by COVID-19 (For example, economic troubles or online learning setbacks)?

## Appendix C: Survey Questions

We are a group of students from Worcester Polytechnic Institute in Massachusetts, and we are working with a kindergarten in China to find out how parental expectations for their children have changed due to events of the COVID-19 pandemic. Currently, we are conducting surveys for children ages 0-6. We would like to know how the pandemic has affected early childhood education and families' home environment.

Your participation in this survey is completely voluntary, and you may withdraw at any time. We ensure that your answers will remain confidential. The information will not be distributed to anyone other than students and project advisors directly involved. No names or identifying information will appear on any of the questionnaires, project reports, or publications. The kindergarten will use this information as suggestions on how to improve their learning experience for young children in China.

Please verify that you are a human




What is your age?

- ○ Under 18
- ○ 18 - 24
- ○ 25 - 34
- ○ 35 - 44
- ○ 45 - 54
- ○ 55 - 64
- ○ 65+

What gender do you identify as?

- ○ Male
- ○ Female
- ○ Non-binary / third gender
- ○ Prefer not to say

What is your ethnicity (select all that apply)?

- [ ] White or Caucasian
- [ ] Black or African American
- [ ] American Indian/Native American or Alaskan Native
- [ ] Asian
- [ ] Latino or Hispanic
- [ ] Native Hawaiian or Pacific Islander
- [ ] Other
- [ ] Prefer not to say

In which country do you currently reside?

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WPI

What is the highest level of school you have completed or the highest degree you have received?

- ○ Less than high school degree
- ○ High school graduate (high school diploma or equivalent including GED)
- ○ Some college but no degree
- ○ Associate degree in college (2-year)
- ○ Bachelor's degree in college (4-year)
- ○ Master's degree
- ○ Doctoral degree
- ○ Professional degree (JD, MD)

Which statement best describes your current employment status?

- ◯ Working (full-time)
- ◯ Working (part-time)
- ◯ Working (self-employed)
- ◯ Not working (looking for work)
- ◯ Not working (retired)
- ◯ Student
- ◯ Prefer not to answer
- ◯ Other

Did you work remotely during the pandemic?

- ◯ Yes
- ◯ No

What is your total household income over the past 12 months?

- ◯ Less than 35,000
- ◯ 35,000 - 69,999
- ◯ 70,000 - 149,999
- ◯ 150,000 - 250,000
- ◯ More than 250,000
- ◯ Prefer not to answer

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What is your relationship with your child(ren)?

- ◯ Mother
- ◯ Father
- ◯ Guardian
- ◯ Grandparent
- ◯ Aunt/Uncle
- ◯ Other

How many children do you have?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ More than 4

How old is your youngest child?

- ○ 0-2
- ○ 3-4
- ○ 5-7
- ○ 8+

Other than you and your child(ren), is there anyone else who lives in your household?

- [ ] Spouse
- [ ] Grandparent(s)
- [ ] Aunts/Uncles
- [ ] No one else
- [ ] Other

What type of education is your child currently enrolled in?

- ◯ Public
- ◯ Private
- ◯ Montessori
- ◯ Home-Schooled
- ◯ Other

Does your child have any physical or learning disabilities?

- ◯ Yes
- ◯ No

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Did your child participate in online learning?

- ◯ Yes
- ◯ No

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WPI

How would you compare the effectiveness of online learning versus traditional in-person learning?

| Much worse | Somewhat worse | About the same | Somewhat better | Much better | Unsure |
|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ |

← →

WPI

How would you rate the pandemic's effect on your child's development of the following skills:

| | Very negative | Somewhat negative | No effect | Somewhat positive | Very positive | Unsure |
|---|---|---|---|---|---|---|
| Social interaction | ○ | ○ | ○ | ○ | ○ | ○ |
| Motor skills | ○ | ○ | ○ | ○ | ○ | ○ |
| Cognitive learning (memorization, comprehension, and evaluation) | ○ | ○ | ○ | ○ | ○ | ○ |
| Emotional skills (recognizing emotions and conveying them) | ○ | ○ | ○ | ○ | ○ | ○ |
| Physical fitness | ○ | ○ | ○ | ○ | ○ | ○ |

How would you rate the pandemics' effects on the following aspects of home life:

| | Very negative | Somewhat negative | No effect | Somewhat positive | Very positive | Unsure |
|---|---|---|---|---|---|---|
| Parent-child relationship | ○ | ○ | ○ | ○ | ○ | ○ |
| Free time | ○ | ○ | ○ | ○ | ○ | ○ |
| Stress | ○ | ○ | ○ | ○ | ○ | ○ |
| Total household income | ○ | ○ | ○ | ○ | ○ | ○ |

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Following the COVID-19 pandemic, what areas of learning would you want schools to place more emphasis on?

| | Much less | Somewhat less | No change | Somewhat more | Much more | Unsure |
|---|---|---|---|---|---|---|
| Increased health protocol | ○ | ○ | ○ | ○ | ○ | ○ |
| Group learning | ○ | ○ | ○ | ○ | ○ | ○ |
| Self-guided learning | ○ | ○ | ○ | ○ | ○ | ○ |
| Communication skills | ○ | ○ | ○ | ○ | ○ | ○ |
| Reading skills | ○ | ○ | ○ | ○ | ○ | ○ |
| Math skills | ○ | ○ | ○ | ○ | ○ | ○ |
| Recreational time | ○ | ○ | ○ | ○ | ○ | ○ |
| Independence (being able of thinking and acting for oneself) | ○ | ○ | ○ | ○ | ○ | ○ |
| Creativity | ○ | ○ | ○ | ○ | ○ | ○ |
| Hobbies | ○ | ○ | ○ | ○ | ○ | ○ |

Are there any other concerns that you have with the pandemic and its educational effects?

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We thank you for your time spent taking this survey.
Your response has been recorded.

## Appendix D: HDU Full Survey Results with Translations

## 疫情背景下幼儿家长对幼儿园的选择及幼儿未来规划的调查问卷

**(**Questionnaire on parents' choice of kindergartens and future planning for young children in the context of the epidemic)

第 1 题　**您的性**别 (Your Gender)：

| 选项 | 小计 | 比例 |
|---|---|---|
| 男 (Male) | 36 | 30.51% |
| 女 (Female) | 82 | 69.49% |
| 本题有效填写人次 | 118 | |

第 2 题　**您的年**龄 (Your Age)：

| 选项 | 小计 | 比例 |
|---|---|---|
| 小于 30 岁 (Less than 30) | 15 | 12.71% |
| 30-39 岁 (30-39) | 44 | 37.29% |
| 40-49 岁 (40-49) | 32 | 27.12% |
| 50 岁及以上 (Over 50) | 27 | 22.88% |
| 本题有效填写人次 | 118 | |

第 3 题　**您是孩子的** (You are the child's)：

| 选项 | 小计 | 比例 |
|---|---|---|
| **爸爸**/妈妈 (Father/Mother) | 86 | 72.88% |
| 爷爷/**奶奶** (Paternal Grandpa/Grandma) | 10 | 8.47% |
| 外公/外婆 (Maternal Grandpa/Grandma) | 5 | 4.24% |
| 其他 (Other) | 17 | 14.41% |
| 本题有效填写人次 | 118 | |

第 4 题　**您的学**历 (Your education)：

| 选项 | 小计 | 比例 |
|---|---|---|
| 高中及以下 (High School and below) | 38 | 32.2% |
| 大专 (Associate's Degree) | 16 | 13.56% |
| 本科 (Bachelor's Degree) | 49 | 41.53% |
| 研究生或以上 (Master of above) | 15 | 12.71% |
| 本题有效填写人次 | 118 | |

第 5 题　**您的工作** (Your job)：

| 选项 | 小计 | 比例 |
|---|---|---|
| 专业人士（如教师/医生/律师等）<br>Professionals (e.g. teachers/doctors/lawyers,etc.) | 28 | 23.73% |
| 服务业人员（餐饮服务员/司机/售货员等）<br>Service Workers (caterers/drivers/salesmen, etc.) | 8 | 6.78% |
| 自由职业者（如作家/艺术家/摄影师/导游等）<br>Freelancers (e.g. writers/artists/photographers/guides, etc.) | 11 | 9.32% |
| 工人（如工厂工人/建筑工人/城市环卫工人等）<br>Workers (e.g. factory workers/construction workers/city sanitation workers, etc.) | 9 | 7.63% |
| 公司职员<br>Company Employees | 30 | 25.42% |
| 事业单位/公务员/政府工作人员<br>Career/civil servants/government workers | 7 | 5.93% |
| 家庭主妇<br>Housewife | 13 | 11.02% |
| 其他<br>Others | 12 | 10.17% |
| 本题有效填写人次 | 118 | |

第 6 题　**您目前每月的家庭**总收入 (Your current total monthly household income)：

| 选项 | 小计 | 比例 |
| --- | --- | --- |
| 5K 以下 (Under 5000 RMB) | 23 | 19.49% |
| 5K-10K | 34 | 28.81% |
| 10K-20K | 29 | 24.58% |
| 20K-50K | 18 | 15.25% |
| 50K 以上 (Over 50000 RMB) | 14 | 11.86% |
| 本题有效填写人次 | 118 | |

第 7 题　**您目前的家庭**总收入相较于疫情前，发生了怎样的变化？(How has your current total household income changed compared to the pre-pandemic period?)

| 选项 | 小计 | 比例 |
| --- | --- | --- |
| 收入降幅较大 (Decreased a lot) | 24 | 20.34% |
| 收入有一定**减少** (Somewhat decreased) | 49 | 41.53% |
| 不变 (No change) | 35 | 29.66% |
| 收入有一定增加 (Somewhat increased) | 8 | 6.78% |
| 收入增幅较大 (Increased a lot) | 2 | 1.69% |
| 本题有效填写人次 | 118 | |

第 8 题　在疫情期间，您是否出现过居家办公的情况？(Did you work from home during the pandemic?)

| 选项 | 小计 | 比例 |
| --- | --- | --- |
| 是 (Yes) | 68 | 57.63% |
| 否 (No) | 50 | 42.37% |
| 本题有效填写人次 | 118 | |

第 9 题　在居家办公期间，您对您孩子的教育了解情况 (What do you know about your child’s education while working from home)：

**该矩阵题平均分：3.46**

| 题目\选项 | 完全不了解 (Nothing) | 不太了解 (Not a lot) | 和之前一样 (Same as before) | 更了解了 (Understood more) | 非常了解 (Understood a lot) | 平均分 |
|---|---|---|---|---|---|---|
| 学习进度 (Learning Progress) | 2(2.94%) | 7(10.29%) | 32(47.06%) | 17(25%) | 10(14.71%) | 3.38 |
| 学习效率 (Learning efficiency) | 1(1.47%) | 5(7.35%) | 30(44.12%) | 21(30.88%) | 11(16.18%) | 3.53 |
| 小计 | 3(2.21%) | 12(8.82%) | 62(45.59%) | 38(27.94%) | 21(15.44%) | 3.46 |

第 10 题　**您的孩子是否参与**过线上学习？(Did your child participate in online learning?)

| 选项 | 小计 | 比例 |
|---|---|---|
| 是 (Yes) | 81 | 68.64% |
| 否 (No) | 37 | 31.36% |
| 本题有效填写人次 | 118 | |

第 11 题　**您**认为和传统线下面对面的学习相比，您孩子在线学习的学习效率是怎样的？(How efficient do you think your child's online learning is compared to traditional offline face-to-face learning?)

| 选项 | 小计 | 比例 |
|---|---|---|
| 比较差 (Much worse) | 19 | 23.46% |
| 稍微差一点 (Slightly worse) | 37 | 45.68% |
| 差不多 (No change) | 18 | 22.22% |
| 稍微好一点 (Slightly better) | 2 | 2.47% |
| 比较好 (Much better) | 5 | 6.17% |
| 本题有效填写人次 | 81 | |

第 12 题　**您**对您孩子所在幼儿园的防疫措施关心吗？(Are you concerned about the pandemic prevention measures at your child's kindergarten?)

| 选项 | 小计 | 比例 |
|---|---|---|
| 是 (Yes) | 101 | 85.59% |
| 否 (No) | 17 | 14.41% |
| 本题有效填写人次 | 118 | |

第 13 题　**您**认为以下防疫措施的重要程度为 (How important do you think the following preventive measures are)：

**该矩阵题平均分：4.39**

| 题目\选项 | 不重要 (Not important) | 不太重要 (Somewhat important) | 一般 (Important) | 很重要 (Very Important) | 十分重要 (Extremely Important) | 平均分 |
|---|---|---|---|---|---|---|
| 核酸检测点的距离 (Distance of testing site) | 1(0.99%) | 0(0%) | 14(13.86%) | 40(39.6%) | 46(45.54%) | 4.29 |
| 核酸检测的频率 (Frequency of testing) | 1(0.99%) | 0(0%) | 20(19.8%) | 38(37.62%) | 42(41.58%) | 4.19 |
| 幼儿**园的消毒工作** (Disinfection of kindergartens | 0(0%) | 0(0%) | 3(2.97%) | 33(32.67%) | 65(64.36%) | 4.61 |
| 对幼儿的体温监测 (Temperature monitoring of children) | 0(0%) | 2(1.98%) | 7(6.93%) | 35(34.65%) | 57(56.44%) | 4.46 |
| 小计 | 2(0.5%) | 2(0.5%) | 44(10.89%) | 146(36.14%) | 210(51.98%) | 4.39 |

第 14 题　**您如何**评价疫情对您孩子以下技能发展的影响 (How would you rate the pandemic's effect on the following developmental skills?):

**该矩阵题平均分：3.27**

| 题目\选项 | 非常消极 (Very negative) | 有些消极 (Somewhat negative) | 没影响 (No effect) | 有些积极 (Somewhat positive) | 非常积极 (Very positive) | 平均分 |
|---|---|---|---|---|---|---|
| 社交互动 (Social interaction) | 7(5.93%) | 38(32.2%) | 29(24.58%) | 17(14.41%) | 27(22.88%) | 3.16 |
| 运动技能 (Motor skills) | 7(5.93%) | 35(29.66%) | 31(26.27%) | 15(12.71%) | 30(25.42%) | 3.22 |
| 认知学习（记忆，理解和估计能力） (Cognitive learning) | 4(3.39%) | 22(18.64%) | 46(38.98%) | 17(14.41%) | 29(24.58%) | 3.38 |
| 情感能力（能认知到且合理传达情绪） (Emotional skills) | 4(3.39%) | 24(20.34%) | 41(34.75%) | 18(15.25%) | 31(26.27%) | 3.41 |
| 身体素质 (Physical fitness) | 6(5.08%) | 37(31.36%) | 31(26.27%) | 15(12.71%) | 29(24.58%) | 3.2 |
| 小计 | 28(4.75%) | 156(26.44%) | 178(30.17%) | 82(13.9%) | 146(24.75%) | 3.27 |

第 15 题　在目前情况下，您更倾向于选择怎样的幼儿园呢？(What kind of kindergarten would you prefer in the current situation?)

| 选项 | 小计 | 比例 |
|---|---|---|
| 更加高端的 (Higher quality) | 21 | 17.8% |
| 相对较好的 (Relatively better) | 65 | 55.08% |
| 不变 (Unchanged) | 30 | 25.42% |
| 相对较差的 (Relatively poor) | 1 | 0.85% |
| 比较低端的 (Relatively low-quality) | 1 | 0.85% |

| | | |
|---|---|---|
| 本题有效填写人次 | 118 | |

第 16 题 **园区**选择 (Campus selection)：

**该矩阵题平均分：4.19**

| 题目\选项 | 非常不同意 (Strongly disagree) | 不同意 (Disagree) | 不一定 (No opinion) | 同意 (Agree) | 非常同意 (Strongly Agree) | 平均分 |
|---|---|---|---|---|---|---|
| 我倾向于选择一所离家近的幼儿园 (I prefer a kindergarten close to home) | 1(0.85%) | 3(2.54%) | 6(5.08%) | 53(44.92%) | 55(46.61%) | 4.34 |
| 我倾向于选择公立的幼儿园 (I prefer a public kindergarten) | 2(1.69%) | 3(2.54%) | 36(30.51%) | 44(37.29%) | 33(27.97%) | 3.87 |
| 我倾向于选择一所有名气的幼儿园 (I prefer a kindergarten with a good reputation) | 2(1.69%) | 5(4.24%) | 46(38.98%) | 35(29.66%) | 30(25.42%) | 3.73 |
| 我倾向于选择一所双语教学的幼儿园 (I prefer a bilingual kindergarten) | 5(4.24%) | 4(3.39%) | 35(29.66%) | 42(35.59%) | 32(27.12%) | 3.78 |
| 我选择幼儿园很看重里面的教师素质水平 | 1(0.85%) | 1(0.85%) | 4(3.39%) | 33(27.97%) | 79(66.95%) | 4.59 |

| | | | | | | |
|---|---|---|---|---|---|---|
| (I prefer a kindergarten with quality classrooms) | | | | | | |
| 我倾向于选择安全设施更完备的幼儿园 (I prefer a kindergarten with more complete safely facilities) | 1(0.85%) | 1(0.85%) | 2(1.69%) | 37(31.36%) | 77(65.25%) | 4.59 |
| 我倾向于选择幼儿家长素质普遍素质高的幼儿园 (I prefer a kindergarten with parents who are generally of high quality) | 1(0.85%) | 2(1.69%) | 7(5.93%) | 47(39.83%) | 61(51.69%) | 4.4 |
| 小计 | 13(1.57%) | 19(2.3%) | 136(16.46%) | 291(35.23%) | 367(44.43%) | 4.19 |

第 17 题　教育模式 (Educational Model)：

**该矩阵题平均分：4.25**

| 题目\选项 | 非常不同意 (Strongly disagree) | 不同意 (Disagree) | 不一定 (No opinion) | 同意 (Agree) | 非常同意 (Strongly Agree) | 平均分 |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 我对幼儿园的教育模式较为重视 (I attach more importance to the education model of kindergartens) | 1(0.85%) | 0(0%) | 8(6.78%) | 42(35.59%) | 67(56.78%) | 4.47 |
| 我择园时会了解幼儿园的教育模式 (I will learn about the educational model of kindergarten when I choose a school) | 1(0.85%) | 1(0.85%) | 7(5.93%) | 43(36.44%) | 66(55.93%) | 4.46 |
| 我赞同学校现行的教育模式 (I agree with the current educational model of the school) | 1(0.85%) | 2(1.69%) | 16(13.56%) | 44(37.29%) | 55(46.61%) | 4.27 |
| 我了解蒙特梭利的教育理念 (I understand the Montessori's philosophy of education) | 8(6.78%) | 13(11.02%) | 17(14.41%) | 41(34.75%) | 39(33.05%) | 3.76 |
| 我赞同孩子参加混龄教育 (I agree with my child's participation in mixed age education) | 2(1.69%) | 17(14.41%) | 34(28.81%) | 30(25.42%) | 35(29.66%) | 3.67 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 我希望孩子在校能多参与实践活动 (I would like my child's participation in more hands-on activities at school) | 1(0.85%) | 1(0.85%) | 5(4.24%) | 38(32.2%) | 73(61.86%) | 4.53 |
| 我希望学校能培**养孩子的自律性** (I want the schools to develop my child's self discipline) | 1(0.85%) | 1(0.85%) | 3(2.54%) | 33(27.97%) | 80(67.8%) | 4.61 |
| 小计 | 15(1.82%) | 35(4.24%) | 90(10.9%) | 271(32.81%) | 415(50.24%) | 4.25 |

第 18 题　教学方式 (Teaching style):

**该矩阵题平均分：4.14**

| 题目\选项 | 非常不同意 (Strongly disagree) | 不同意 (Disagree) | 不一定 (No opinion) | 同意 (Agree) | 非常同意 (Strongly Agree) | 平均分 |
|---|---|---|---|---|---|---|
| 我希望疫情时期必要时可以采取线上教学模式 (I would like to switch to online learning if necessary, during the pandemic) | 3(2.54%) | 5(4.24%) | 24(20.34%) | 45(38.14%) | 41(34.75%) | 3.98 |
| 我不希望孩子长期盯着网课设备 | 3(2.54%) | 3(2.54%) | 8(6.78%) | 49(41.53%) | 55(46.61%) | 4.27 |

| | | | | | | |
|---|---|---|---|---|---|---|
| (I don’t want my child to stare at the online classroom for a long time) | | | | | | |
| 我认为线上教学让监护人陪伴是有必要的 (I think it is necessary to have a guardian during online learning) | 1(0.85%) | 4(3.39%) | 13(11.02%) | 54(45.76%) | 46(38.98%) | 4.19 |
| 我希望能采取更多的亲子互动活动 (I would like to see more interactive parent-child activities) | 1(0.85%) | 2(1.69%) | 9(7.63%) | 53(44.92%) | 53(44.92%) | 4.31 |
| 我希望线上教学能保证孩子的运动时间 (I would like to ensure that my child has time to exercise) | 1(0.85%) | 2(1.69%) | 5(4.24%) | 53(44.92%) | 57(48.31%) | 4.38 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 我认可线上教学的内容和方式 (I agree with the content and style of online teaching) | 3(2.54%) | 5(4.24%) | 32(27.12%) | 46(38.98%) | 32(27.12%) | 3.84 |
| 我希望让孩子线上作业简单一点 (I want to make my child's online homework easier) | 1(0.85%) | 5(4.24%) | 24(20.34%) | 49(41.53%) | 39(33.05%) | 4.02 |
| 小计 | 13(1.57%) | 26(3.15%) | 115(13.92%) | 349(42.25%) | 323(39.1%) | 4.14 |

第 19 题 未来规划 (Future plans)：

**该矩阵题平均分：3.89**

| 题目\选项 | 非常不同意 (Strongly disagree) | 不同意 (Disagree) | 不一定 (No opinion) | 同意 (Agree) | 非常同意 (Strongly Agree) | 平均分 |
|---|---|---|---|---|---|---|
| 我希望孩子能衔接上小学的课程 (I want my child to be connected to the elementary school curriculum) | 2(1.69%) | 3(2.54%) | 18(15.25%) | 44(37.29%) | 51(43.22%) | 4.18 |
| 我赞同孩子未来进入蒙特梭利小学或国际小学 (I approve of my child's future in Montessori or international elementary school) | 7(5.93%) | 7(5.93%) | 39(33.05%) | 38(32.2%) | 27(22.88%) | 3.6 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 我期望培**养孩子在美**术/马术/射箭/足球等方面的爱好<br>I want to develop my child’s hobbies in art/equestrian/archer/soccer, etc.) | 2(1.69%) | 4(3.39%) | 27(22.88%) | 50(42.37%) | 35(29.66%) | 3.95 |
| 我期望培**养孩子学会做**饭/打扫/骑车/游泳等技能<br>(I want my child to learn cooking/biking/swimming skills) | 1(0.85%) | 1(0.85%) | 5(4.24%) | 52(44.07%) | 59(50%) | 4.42 |
| 我考虑未来送孩子出国<br>(I am considering sending my child at the end of the year) | 6(5.08%) | 12(10.17%) | 69(58.47%) | 15(12.71%) | 16(13.56%) | 3.19 |
| 我希望孩子在幼儿**园能国内外**课程双向接轨<br>(I want my child to be able to learn both domestic and international curriculum in kindergarten) | 2(1.69%) | 5(4.24%) | 35(29.66%) | 41(34.75%) | 35(29.66%) | 3.86 |
| 我希望孩子未来在国内学校就读<br>(I want my child to study in a domestic school in the future) | 1(0.85%) | 2(1.69%) | 31(26.27%) | 46(38.98%) | 38(32.2%) | 4 |
| 小计 | 21(2.54%) | 34(4.12%) | 224(27.12%) | 286(34.62%) | 261(31.6%) | 3.89 |

第 20 题　**您**对幼儿园还有什么看法 (What else do you think about kindergarten?)：

## Appendix E: Survey Flyer

## Appendix F: Follow-up Survey Example Questions

### Informed Consent

(Communicated verbally at the start of each interview)

We are a group of students from Worcester Polytechnic Institute in Massachusetts, and we are working with a kindergarten in China to find out how parental expectations for their children have changed due to events of the COVID-19 pandemic. Currently, we are conducting following-up interviews to our survey to gain a deeper understanding of the parents' view on this topic

Your participation in this interview is completely voluntary, and you may withdraw at any time. You may choose to skip a question if you do not want to answer it. We ensure that your answers will remain confidential. All interviews will be recorded for reference but will not be distributed to anyone other than students and project advisors directly involved. No names or identifying information will appear on any of the questionnaires, project reports, or publications. The kindergarten will use this information as suggestions on how to improve their learning experience for children ages 0-6.

### Questions

1. You said you have 2 children with the youngest one being ages 0-2. How old is your first child?
2. On the question about aspects of home life, you said the pandemic had a negative effect on your parent-child relationship, free time, and stress. Can you elaborate on what your home life during quarantine looked like?
3. Our background research showed a largely negative effect on children's development due to the pandemic, but you answered that the pandemic had no effect on your child's development, is there any reason for that? Why do you think that is?
4. You said you want more emphasis on recreational time, creativity, and hobbies, which matches our previous research. How do you think schools can adapt to place more emphasis on these things?

## Appendix G: Full Demographics Table

| Demographic | Frequency | Percent |
|---|---|---|
| *Age* | | |
| 25-34 | 13 | 26.00% |
| 35-44 | 33 | 66.00% |
| 45-54 | 3 | 6.00% |
| 55-64 | 1 | 2.00% |
| *Gender* | | |
| Male | 14 | 28.00% |
| Female | 36 | 72.00% |
| *Ethnicity* | | |
| White or Caucasian | 38 | 73.08% |
| Black or African American | 1 | 1.92% |
| Asian | 7 | 13.46% |
| Latino or Hispanic | 3 | 5.77% |
| Native Hawaiian or Pacific Islander | 1 | 1.92% |
| Other | 2 | 3.85% |
| *Education* | | |
| High School Diploma or equivalent | 1 | 2.00% |
| Some college but no degree | 3 | 6.00% |
| Associate Degree | 3 | 6.00% |
| Bachelor's Degree | 16 | 32.00% |
| Master's Degree | 16 | 32.00% |
| Doctoral Degree | 10 | 20.00% |
| Professional Degree | 1 | 2.00% |
| *Employment status* | | |
| Working (full time) | 41 | 82.00% |
| Working (part time) | 1 | 2.00% |
| Not Working (retired) | 1 | 2.00% |
| Prefer not to answer | 2 | 4.00% |
| Other | 5 | 10.00% |
| *Worked remotely during the pandemic* | | |
| Yes | 29 | 58.00% |
| No | 21 | 42.00% |
| *Yearly household income* | | |
| Less than 35,000 | 1 | 2.00% |
| 35,000 - 69,999 | 9 | 18.00% |

| | | |
|---|---|---|
| 70,000 - 149,999 | 18 | 36.00% |
| 150,000 - 250,000 | 14 | 28.00% |
| More than 250,000 | 6 | 12.00% |
| Prefer not to answer | 2 | 4.00% |
| | | |
| *Relationship to child(ren)* | | |
| Mother | 35 | 70.00% |
| Father | 15 | 30.00% |
| | | |
| *Number of children* | | |
| 1 | 13 | 26.00% |
| 2 | 26 | 52.00% |
| 3 | 7 | 14.00% |
| 4 | 3 | 6.00% |
| More than 4 | 1 | 2.00% |
| | | |
| *Age of youngest child* | | |
| 0-2 | 22 | 44.00% |
| 3-4 | 15 | 30.00% |
| 5-7 | 13 | 26.00% |
| | | |
| *Who else lives in the household* | | |
| Spouse | 48 | 85.71% |
| Grandparent(s) | 5 | 8.93% |
| Other | 1 | 1.79% |
| No one else | 2 | 3.57% |
| | | |
| *Child's current education* | | |
| Public | 25 | 50.00% |
| Private | 15 | 30.00% |
| Montessori | 3 | 6.00% |
| Home-Schooled | 2 | 4.00% |
| Other | 5 | 10.00% |
| | | |
| *Physical or learning disability* | | |
| Yes | 3 | 6.00% |
| No | 47 | 94.00% |

Table 3: Demographics Questions from U.S. Data