

# **Effects of Montessori Education in China**

An Interactive Qualifying Project

submitted to the Faculty of

WORCESTER POLYTECHNIC INSTITUTE

in partial fulfillment of the requirements for the

degree of Bachelor of Science

by

Mathew Daniels-Diehl

Grace Holod

Nick Vachon

11 December 2020

Reported Submitted to:

Professor Hansong Pu

**Ellie** (宋美娇), Andy, and Xiaomei Wu

Yimi's Children's House Montessori School

Professors Hansong Pu and Joseph Sarkis

Worcester Polytechnic Institute

# Abstract

Yimi's Children's House Montessori School in Hangzhou China, sponsored an IQP to explore real life stories and testimonials to help promote Montessori education in China. One goal was to provide a deliverable that the sponsor could use to express these stories in a meaningful and attractive way. Our methodology consisted of gathering testimonials through interviews and surveys and using this information to create a web page design that the sponsor could add to their existing website. Additionally, our team created an infographic that compares Montessori and traditional education methods. The expression of these stories and the infographic provide the sponsor with a meaningful way of displaying the benefits of Montessori education.

# Acknowledgements

This research was made possible by the help and support of many hard working individuals. Firstly, we thank our advisors Professor Laura Roberts, Professor Hansong Pu, and Professor Joseph Sarkis for their dedication and guidance through each stage of our project. In addition, we would like to thank Professor Yunhong Shen for his time and guidance as well. Next we would like to thank the WPI Global Lab advisors Professor Leslie Dodson and Stephan McCauley for their direction on how to approach our web based deliverable. We would also like to acknowledge our HDU teammates, Frank (楼朗见), Pique(依热帕尼), Spring (王金泉), and Arabella (李宁娟) from China for committing so much of their free time to helping us conduct field research in Hangzhou. It is also important for us to appreciate the humble and honest responses of each and every survey and interview participant we questioned to reinforce our research. Lastly, none of this would be possible without the support and action of our sponsor, Yimi's Children's House Montessori School in Hangzhou China.

# Executive Summary

## **Project Goal**

Our group's main goal is to create a tool that our sponsor school can use to educate the general public about the benefits and experiences of the Montessori educational method, and its unique effect on children as they transition to adulthood. Inspired by our sponsor, Yimi's Children's House Montessori School, we sought real-life stories to support their vision.

This project addresses the broader issue of the right to education while also addressing the specific issue of removing stigma around Montessori schools in China. Education is a human right because it provides the foundation of a career that enables stability in a person's life, as well as creating the basis for a successful society. China is a global power, and their education system is the largest in the world. Their old education system is steeped in tradition which makes change difficult for the population to accept. This is why the general population is less accepting of a Montessori education methodology; they feel it is a threat to societal norms (Ms. Ge, personal communication, 2020). The sponsor school wishes to change this perception by collecting real-life testimonials of people who were positively affected by Montessori to show the general public that Montessori education is not a threat to the education system.

## **Background**

Our background research covers a broad spectrum of information including the right to education, an in-depth analysis of Chinese education, as well as Montessori education both in international schools, and in China. Our team also researched the direct effects of Montessori on individuals through both field research, and source analysis. The background research is used to support our methodology of finding the effects of Montessori education on children as they transition to adulthood. By researching each element of education that could affect the student, our team can approach the project objectives with an understanding of education from many important standpoints.

**Objective 1: Evaluate and compare Montessori participant data to formulate an understanding of the effects Montessori education has on individuals.**

Objective one was created to set a data collection method in place. In this step, our background research, interviews, and survey data are used to analyze and better understand the direct effects of Montessori education. With this information, our group can obtain resources and use them in creative ways to supply the sponsor with deliverables that can help them better describe these effects to their clients and/or participants. This objective sets our team up to achieve the other two major objectives as a result.

**Method:**

To accomplish this objective, we investigated the effect Montessori education has on students as they transition into their adult lives. Surveys were widely distributed to Montessori alumni and parents of Montessori school children through personal connections and by collaboration with various Montessori schoolhouses in the United States and in China. The surveys were in long answer format to allow in-depth answers regarding one's experiences with Montessori. The next action was to follow up with survey respondents with a semi-structured interview. These interviews were filmed and provided more detailed experiences and memories of the alumni's time in Montessori education.

**Objective 2: Analyze and compare background information about the styles of Montessori and traditional education to provide a visual unbiased comparison of each.**

Objective two was created to solve a lasting issue that our sponsor school has recognized and shared with us. In China, resources stating information about Montessori education is often biased, or swayed in favor of the traditional methods. Our group recognized that if we can research the pros and cons of each education method, and display them in a creative, and easy to read format, that the sponsor would have a convincing tool to better inform curious clients. An infographic would be readily available to supply them with information, allowing the parent to make an initial educated decision about how best to educate their children.

**Method:**

We produced an infographic that showed a side-by-side comparison of the three main differences between Montessori and traditional education; learning style, teaching style, and classroom environment. The infographic was developed with efficiency in mind, as the format provides the viewer with quick facts about each key section.

**Objective 3: Use the Montessori participant data to develop media-based assets that highlight the experiences of members in Montessori education.**

Our team's final objective was founded around the collection of the Montessori interview and survey participant data. Our client stated in their project description that they were looking for real life stories and testimonials of people who were/are directly affected by Montessori education. Objective three takes these stories and displays them directly on the sponsor's website to be viewed by their clients or participants. Here, people can and hear and see the stories of alumni, teachers, and parents changed by Montessori. This design matches their old design and acts as a library of the highlighted experiences of participants in Montessori education.

### **Method:**

This methodology step encompasses producing all of our media assets from the collected information from methodology step one, as well as putting them into a package that will contain a webpage storyboard design. We will use the collected audio and video from the interviews conducted earlier to create video clips that testify to Montessori education's positive influence. Finally, once all of our media assets are approved by our sponsor and finalized, a storyboard with all of our assets and information was developed to add to their existing website. In our first meeting with Leslie Dodson, a professor from the WPI Global Lab, we learned how to use our survey and interview information to formulate useful and effective media based assets to be used on a digital platform. Next, we met with Professor Stephan McCauley. In this meeting, he discussed the logistics of creating an easy to understand web package. Our team was focused on getting the most value out of the media assets we produced. Professor McCauley suggested that aspects of the package should be presented in such a way that they may be used for more than just the webpage. As a result, our final deliverable is able to provide the sponsor with assets they may use on WeChat, their own website, social media, and any other social informative communication regarding Montessori education.

### **Findings**

This section contains the findings that resulted from the execution of our methodology section. After completing each objective we analyzed the subsequent data that we deemed essential for the completion of our project. These findings include the analysis and comparison of interview and survey data from objective one, the traditional and Montessori educational comparison from objective two, and the effects of building media-based assets and applying the research to a webpage format from objective three.

In objective one, our team analyzed the conducted survey and interview data of participants in Montessori to obtain a better understanding of how the effects we researched in our background section affected those individuals. For each interview participant type (parent, teacher, or alumni) we focused on highlighting key responses in relevant educational topics. This way, we could easily compare our findings to that of our previously conducted research. Overall, our team found that much of the collected research data matched what we found in published research. In addition, we found that the methodologies and principles of Montessori were useful to our participants later in their adult lives.

For objective two's deliverable, we were able to find three major differences from our background information between Montessori and traditional education: teaching styles, learning styles and classroom environment. Montessori education has a child-centered teaching style, the children learn autonomously, and they have an open classroom environment. Meanwhile, traditional education has a teacher-centered teaching style, children depend solely on the teacher to learn, and it has a rigid classroom environment. From this information, we created a clear, concise, and objective infographic that the sponsor can use to educate the general public.

In producing the four video assets from objective three, our team discovered that many, if not all, of the recorded interviewees were passionate about their time spent in and/or around Montessori education. We also found that integrating these media assets into a web format is very effective, as it is an easily accessible and distributable platform of information. When drafting the webpage, the interactive nature makes the webpage more engaging, and also enables users to learn.

## **Conclusions and Recommendations**

We found that the feelings and stories of our participants closely match to that of our research. After relating this data to our background research, we found that current participant data is reliable when exploiting different ideas and concepts about Montessori education. As such, we conclude that the sharing and connection of these stories with other individuals is an important aspect of promoting and informing others about the benefits of Montessori education.

From our infographic, we determined a few recommendations for parents considering Montessori education and those operating Montessori facilities. For parents, we suggest that they read a few books or talk to other parents who have children in Montessori schools to learn about Montessori methods. This recommendation is made because all Montessori schools in China are private and tuition is expensive so parents must feel that it is worth sending their child. For those running Montessori schools, we recommend actively educating the general public about Montessori methods because it will decrease the public's bias against Montessori schools.

After developing our media assets and applying our field data to a web format and analyzing those findings, we concluded that this potential integration to our sponsor's existing website or WeChat platform will positively affect their growth. We recommend that the webpage is reproduced on their website or WeChat, and that individuals interested in Montessori education and our sponsor's school be directed there for information. Here, potential clients can have questions and concerns answered by previous enrollee's, teachers, and parents, potentially encouraging them to enroll their student in our sponsor's schoolhouse.



# Table of Contents

Abstract	I
Acknowledgements	II
Executive Summary	III
Table of Contents	VIII
List of Tables	1
List of Figures	2
1. Introduction	3
2. Background	5
2.1 Right to Education	5
2.2 Education in China	6
2.3 Montessori Education	8
2.3.1 History	8
2.3.2 Montessori Methodologies	8
2.3.3 Principles	10
2.4 Montessori Education Effects on Students	11
2.5 Montessori Education in China	12
3. Methodology	14
3.1 Methodology Based on Objective	15
3.1.1 Objective 1	15
3.1.2 Objective 2	17
3.1.3 Objective 3	18
3.2 Challenges	19
4. Findings	21
4.1 Teacher Participants	22
4.2 Parent Participants	25
4.3 Alumni Participants	27
4.4 Objective 2	30
4.4.1 Teaching Style	30
4.4.2 Learning Style	30
4.4.3 Classroom Environment	31
4.5 Objective 3	32
5. Conclusions and Recommendations	33

5.1 Teacher Participants	33
5.2 Parent Participants	34
5.3 Alumni Participants	35
References	38
APPENDIX	42
Appendix A	42
Appendix B	43
SURVEY/QUESTIONNAIRE QUESTIONS FOR STUDENTS/ALUMNI	43
SURVEY/QUESTIONNAIRE QUESTIONS FOR PARENTS (YES/NO/SHORT ANSWER)	45
Appendix C	47
INTERVIEW QUESTIONS FOR ALUMNI	47
INTERVIEW QUESTIONS FOR TEACHERS IN MONTESSORI EDUCATION	49
INTERVIEW QUESTIONS FOR PARENTS OF MONTESSORI STUDENTS	51
Appendix D	54
Informed Consent	54
Appendix E	56
Procedure for obtaining informed consent for interviews	56
Appendix F	58
Appendix G	59
Appendix H	60
Appendix I	61



# List of Tables

**Table 1.** Years of Montessori School Vs. Motivation in School, page 22

**Table 2.** Teacher Characteristics, page 23

**Table 3.** Parent Characteristics, page 26

**Table 4.** Alumni Characteristics, page 28

# List of Figures

**Figure 1.** Years of traditional Vs. Montessori Education, page 22

# 1. Introduction

Education is essential to societal function and standard of living and therefore is a human right. People who have access to an education system are more likely to stay in school longer than those who do not. The more schooling someone has, the more likely they are to get a well-paid job and increase their standard of living for themselves and their families. However, not all education systems are created equal. Parents and prospective students want to know which education system has the most beneficial outcomes so the students can receive the best quality education to get the best start in life. Our sponsor, Yimi's Children's House Montessori School, wants to research the benefits of Montessori education and compare the results with the benefits of traditional education in China.

Yimi's Children's House Montessori School is a Montessori based education program in Hangzhou, China. They are looking to explore how these Montessori methods set apart their students' educational capabilities, in comparison to other more traditional methods. They are looking for real personal stories, ones that testify to a student's growth as they learn through the Montessori method, and transition into adulthood.

Many parents of prospective students may share a concern that Montessori education does not provide any benefits outside of traditional education, and that Montessori education may even be detrimental to students who cannot be self-driven. However, our background research suggests that Montessori education is very beneficial to students in the long and short term, as studies highlight advanced development in Montessori education students (Denervaud, 2019; Lillard, 2006; Keith, 2014). Research also indicates that students who participate in early-stage Montessori education are likely to exhibit these beneficial traits later in life (Keith, 2014; Wu, 2019).

Montessori education has been on the rise globally in recent decades, but additional research is needed to be done to say whether or not it has more benefits, specifically compared to traditional education in China. The following research studies have conflicting results. They conclude that Montessori education is much better than traditional because the students develop more complex thought processes, become better at playing pro-socially, and tend to score higher on math tests. Specifically in the study done by Denervaud, the students who went to Montessori school measured higher average in tests on convergent and divergent creativity as well as academic tests (Denervaud, 2019). Other studies, such as the study done by Lopata in

2005, have found that Montessori education has no different results than traditional schools or even do worse than traditional schools in academic tests (Lopata, 2005).

Over the last 30 years, Montessori education has grown exponentially in China, and the sponsor would like to have comparative research to potentially influence further growth and participation in this method. The goal of our project is to assemble and correlate research about the possible effects of the Montessori methodology and what those effects are on students. Our end work should be easily understood by the public and should be used as a resource for obtaining a better understanding of this educational method. By including real-life stories, we hope that people will recognize the lifelong effects of this method and consider it for their children.

In the coming sections, this report aims to educate readers on overviewing the effects of Montessori education by discussing the history of education, education in China, and the Montessori method. Then, later in the report, we will discuss the specific effects of Montessori education in general and in China compared to traditional education and analyze them to identify possible reasons for differences.

## 2. Background

### 2.1 Right to Education

Education is a basic human right because it is the basis for an individual's societal function and standard of living. Low-income countries have vastly higher out-of-school rates for children and higher poverty rates compared to middle income and higher-income countries (UNESCO, 2017). For instance, there is a correlation between the graph of GDP per capita in the United States against the graph of high school drop-out rate in the same time periods, where GDP per capita increases the high school drop-out rate decreases (Per capita U.S. real..., n.d.; Rate of high school drop-outs..., n.d.). It can be interpreted that the longer children stay in school, the more likely they are to have a better life as adults which increases the country's GDP per capita. Education is a major key to a person's ability to improve their life which is a human right (UN, n.d.).

This effect can be seen in Indonesia when the Indonesian government changed the education curriculum and constructed 61,000 new schools which increased access to education for thousands of new students. This led to a rise in the number of students as well as multiple other benefits such as a greater number of years in school, better work opportunities, and improved living standards. The more education the students completed, the more likely they would migrate and have improved living standards. Men who have been through the new system were more likely to work in non-agricultural sectors that have higher salaries. Therefore they have more opportunities to move into wealthier communities. These benefits also had intergenerational effects. Households with either parent exposed to the new schools have higher living standards, better housing, and more assets. This gives the second generation a better start in life than the previous generation. The second generation, especially daughters, are affected the most if their mothers have been through the education system. It can be assumed the mothers can teach their daughters the educational and life lessons they learned in school to give them a head start (Akresh, 2018).

Another example can be seen from a study done in Colombia, where families who received remittances, money sent from family or friends to spend on food and other goods, would use it to have their children attend private schools. The study showed that if the family



could afford to, and even if they could not, they would try to send their children to private schools because it was a better education than the public (Medina, 2010). People who have low educational attainment are more likely to be in poverty or socially excluded which has a negative effect on their lives (Europe 2020 indicators..., 2020). It can be inferred that education is nearly as important as healthcare and housing because it gives the students a further start in life (Medina, 2010).

As people become more educated, they have more job opportunities with higher salaries which leads to a higher living standard as families can afford more than just-food. Families are then also able to migrate to better communities that will benefit future generations. Also, the government collects more money on taxes that they can then use to make improvements on infrastructure and more. The more money a balanced government has, the more growth and success it can have. Since education is essential to a successful country and China is a global power, let us examine their education system.

## **2.2 Education in China**

The traditional education system in China is rigid and scheduled. Confucianism and collectivist culture have played a big role in creating a teacher-oriented education system rather than a student-oriented one. Since Confucianism enforces respect for elders and collectivist culture emphasizes harmony, students become complacent and respectful, community-driven adults. They learn the effort they put in is not just for themselves, but for their community.

The main principles of Confucianism say that society is made up of interrelated parts that can only function in harmony and anything out of what is considered ordinary, or normal, will create an imbalance in the system and be detrimental to society (Schmidtke and Peng, 2012). In the article by Schmidtke and Peng, they go over how China has incorporated pieces of Western education systems in the past 150 years. However, it is only ever incorporated in around Confucianism principles which Schmidtke and Peng say creates a static society (Schmidtke and Peng, 2012).

In a study from 2019 by Wu, she reported that the traditional classroom consisted of a headteacher and multiple subject teachers, where the head teacher is responsible for teaching and controlling the classroom. In addition to teachers, the study stated that a couple of students are

made or voted by their peers to be a student administrator who helps manage class and keep order among classmates since it can be difficult for the teacher to watch everyone. Wu described the teacher's role to be similar to a parental figure, with strict demands of the students as well as being comforting and caring, which results in close teacher-student relationships (Wu, 2019).

Even though the student-teacher relationships are close the teaching methods are authoritarian. Every student-teacher interaction must hold up to cultural principles, discipline, and organization (Wu, 2019). Social norms are strictly followed because it keeps order and peace. Teachers always stand and lecture while students sit and listen which emphasizes that teachers are of higher status than students and must be treated with the utmost respect and that they control the room (Tan, 2016). This way of lecturing and listening is called one-way installation teaching. It leaves no room for students' opinions or questions and if there are questions, there is only one right answer. Students are seen as vessels to hold information in and not made to form their own opinions (Wu, 2019).

China's education system is heavily based on test scores, rote learning, and memorization (Ma, 2018). Since students are only rewarded for high test scores, the education system depends on how well students can memorize facts and concepts rather than how they can come to creative conclusions from information (Tan, 2016). There is typically one large test per course, so if a student does poorly on it, they do not have a second chance (Ma, 2018). Middle school and high school students are typically in school for 1,190 hours a school year and take 10 classes. They have 3 core classes: Chinese, mathematics, and morality and society. In addition, they usually start taking a foreign language class in third grade and go through high school (Cui, 2018). In the past decade, China has started to change its education system from over-emphasizing textual knowledge to catering more to the students' learning needs by incorporating cooperative learning, hands-on activities, and encouraging inquiries during class (Tan, 2016). The goal is that through cooperative learning, students will solve real-life problems together and create a closer sense of community with each other and the teacher. Even though there has been progress towards catering education to the students, it is only to the point where it does not affect social norms.

From Confucianism and collectivism, China has created an authoritarian education system. It is a teacher-oriented system where the teachers are responsible for lecturing and enforcing rules on students. This test-centered, teacher-oriented education system results in

students who are effort driven rather than curiosity-driven. However, recently China has slowly started to change its curriculum to be more student-oriented. As China continues to make improvements to its traditional education system, a new type of education system called Montessori education is on the rise.

## **2.3 Montessori Education**

### **2.3.1 History**

Montessori methods had to evolve to become the education system it is today. Montessori education was started in Rome by Dr. Maria Montessori (Marshall, 2017). After studying the natural way children learn, she began to study, explore, and apply her knowledge in children's education towards creating a new education system.

In 1900, Dr. Montessori started a school for teachers, where they would learn her methods. In the beginning, it was a special education directed program, and as more teachers came to learn her methods, they also began to see the direct positive effects these methods were having on their students (AMS, 2020). In 1907, she would open her first official Montessori designed school for poor kids in Rome (Marshall, 2017). By 1910, schools scattered throughout Europe began implementing Dr. Montessori's methods. Only one year later in 1911, the first Montessori school opened in Tarrytown, NY in the United States. Dr. Montessori went on to provide the official base work of Montessori education in 1916 in her book "*The Advanced Montessori Method*" (AMS, 2020).

Throughout its creation, the Montessori methodology continued to grow and refine. The methodology is one of the main driving forces behind Montessori education. It lays the foundation for many Montessori educational schools worldwide. By following these methods, educators diverge from more traditional classroom methods of education.

### **2.3.2 Montessori Methodologies**

The first method is based around the idea that the teacher, student, and environment create a dynamic triad. A perfect combination of concepts that work hand in hand with one another, that, when done correctly, creates the ideal educational scenario for learning in young

minds (Marshall, 2017). Traditionally, it is common for the teacher to be the highest will of power in the classroom, with most of the educational value coming from how the teacher arranges the class material. Often, each child is one of many, instead of one with its own unique educational experience. Traditional methods tend not to focus on making a change in the experience by enhancing the surrounding environment to encourage the learning mindset. This first method builds the basis for all of the other Montessori methods, most of which focus on enhancing one of these three, equally important, triad components of learning.

The next method revolves around the idea that the teacher should be just as willing, and able to obtain a self-didactic mindset, as the student. Both teachers and students need to learn to autonomously educate themselves. When the teacher is constantly learning how to execute the Montessori method for their learners, it continuously improves the chances that a student will gravitate towards their own autonomous education (Elkind, 1983).

In light of this autonomy goal, the following method was developed in hopes to influence the student to find their own academic way. It states to allow a student to find their optimal subject, rather than force many subjects their way, expecting them to excel in all. This starts a child in an educational topic they enjoy learning. If a young mind is enjoying something, they will likely want to do more of it, further motivating them to autonomously educate themselves about such subjects. The idea is that this autonomous mindset will then transfer to more subjects as they are introduced (Marshall, 2017).

This next method builds upon the last method, simply stating the fact that learning is more effective when the student or subject is motivated to learn. They use the application of this idea in common life and apply it to education. If anyone is ever motivated to do anything in life, their ability to learn to do such a task is much more effective (Salassa, 2018).

Next, it is easier to teach a comprehensible task to a young mind, than something that is incomprehensible. Children need the simplest base knowledge to build off before being expected to understand more complicated understandings. The Montessori method is a reminder that this education system will build upon past comprehensible knowledge, to obtain a checkpoint that could never have been achieved before. You cannot get to the tenth stair in a staircase without first climbing the other nine (Salassa, 2018).

The last and final important method is to enhance social amplitude by enriching children's comprehension in group activities. Human minds work well when combined, even at

an early age. It is not uncommon for a Montessori school to host three-hour work cycles, in which groups of students work together in learning, and applying their knowledge towards an activity. To further enhance the effectiveness of this, it is crucial that no one group “wins” or “loses”, but rather that the positive traits of every group are recognized (Marshall, 2017).

### **2.3.3 Principles**

Where the methodologies explain the exact actions that are taken in ensuring the success of the Montessori system, principles act more like the laws of the system. Statements and testimonies that combine with the Montessori methods to clarify the meaning, and will of the system. It could be implied that the principles could be used as instructions for the creation of a Montessori foundation.

One of the cardinal principles affirms that each child is seen entirely in their uniqueness. At no point should any student feel judged for expressing who they are physically, mentally, or spiritually. This prepares the environment to be a positive, accepting place where students should feel comfortable to participate (Salassa, 2018).

Included in this idea, is the proclamation that the student is always the hero of their educational journey. So, rather than the teacher being the center point of many students' education, the more they act as a pillar of support to each pupils' educational understanding. In this way, each student feels individually important, and feel it is more of their responsibility than anyone else to complete their academic journey (Salassa, 2018).

Furthermore, a sub-principle expands upon this, specifying that an intervention from an adult is to be used to foster and build up the autonomous mindset of the student, whenever possible. If each interaction with the teacher enhances a student's ability to self learn, then the final goal of self-disciplined problem and conflict solving becomes clearer (Salassa, 2018).

Building on autonomous learning, a few of the following principles work in unison to develop an environmental tool towards helping the student. The physical environment surrounding the students should encourage the Montessori education path. It should be built to remind the student that they are their success and that they have the resources to complete their understanding of the topics being presented. Their education is their personal choice. They can mold and build upon it, as well as take away what they believe may be holding them back from a bigger picture. Of course, all while the proctors observe and guide them to do so.

The final set of principles uses all of the above principles to seal the documentation for what sets Montessori education apart from other academic structures. Essentially, each child is understood to have their own skills and ideas. Individually, they are all attracted to different academic branches, each of which they will approach differently (Salassa, 2018). The development of autonomy can only be achieved through the decisions made by the student, the environment surrounding the student, and the application of the methodology by the teacher (Lopata, 2005). When all is done correctly, it completes the educational path set for each student given the opportunity to learn in this way (Salassa, 2018).

With a better understanding of how Montessori education differs from other academic methods, we can now explore the direct effects of this system on the student.

## **2.4 Montessori Education Effects on Students**

The key draw of Montessori education for parents and their future students is the potential academic effects. Individuals interested in Montessori education would like to know how this modern method of education stacks up against traditional methods, or how a school that appears to have no structure can provide essential building blocks for students in early development. Based on various studies, as students progress through Montessori education, they tend to score higher in almost every academic subject and test, have advanced social skills, and display other favorable qualities of development. In a cross-sectional study conducted by Denervaud et al, researchers determined that students who participated in a Montessori school system had higher averages in tests measuring language development, mathematics, and well-being when compared to their traditional education counterparts. The test averages differed by 15%, 21%, and 11%, respectively (Denervaud, 2019). In the same cross-sectional study, students enrolled in the Montessori program had a higher average in tests that measured convergent and divergent creativity. The Montessori students tested two points higher in the convergent test and tested three scoring points higher in the divergent creativity test (Denervaud, 2019). Using data analysis tools, the authors were able to assemble the radiant quantitative representation using the four important towers of education; well being, creative skills, executive function, and final academic outcomes, and found Montessori methods were prosperous in all categories of development (Denervaud, 2019).

In addition, students in the Montessori setting displayed advanced social skills and interactions with peers. When measuring the social capabilities of subjects, students with a Montessori background tended to enjoy talking with others of opposing backgrounds and opinions to broaden their perspectives (Keith, 2014). Children from Montessori schools also “engaged in more positive interaction on the playground” and gave positive assertive responses to social problems (Lillard, 2006). These students exhibited advanced social problem solving and surpassed the social capabilities of their traditional schooling counterparts. When measuring the emotional complexity of these students, Montessori students measured better in categories including social competence, and control of anxiety, aggressiveness, exclusion, and anger (Lillard, 2006).

Furthermore, Montessori students displayed traits in other aspects that surpassed students enrolled in traditional schooling. Montessori students also reported an increased “liking” of scholastic tasks and sought out academic tasks without direction. Montessori education also equalized outcomes of subgroups who were typically subjected to unequal outcomes, such as poverty-stricken individuals, split families, etc. (Lillard, 2017). Aside from academics, children attending Montessori systems were more active than children attending traditional preschools, which suggests that the Montessori method may be an important strategy for promoting physical activity in children (Pate, 2014). When assessing the spatial skills of Montessori students, they also displayed a mastery of spatial orientation and awareness (Lillard, 2017). Students who go through six or more years of Montessori education tend to be more self-driven to learn, rather than be motivated by extrinsic factors (Keith, 2014). Montessori students tend to have a higher level of complex thinking compared to traditional students (Keith, 2014;Lillard, 2006). Students of six or more years of Montessori education have a solid sense of self as well as an understanding that they are responsible solely for their actions and not others. (Keith, 2014). Now that we understand some of the effects of Montessori education, we can learn why people in China have started to implement Montessori schools.

## **2.5 Montessori Education in China**

As we investigate the effects that Montessori education methods have on students, it is essential to apply this analysis to schooling in China. In the past 100 years, China has

transformed into both education and industry. This rapid development brought in a wave of new ideas, particularly in terms of education. China has experienced major turning points for education; one in the 1920s, and one in the 1980s (Zhu and Zhang, 2008). The Chinese education system, from primary to higher education was built following the models of old western education systems, particularly the United States education system. Many schools were established in the early 1900's by missionary educators, and many of those schools still exist today. The initial reform for the development of individuality began in 1922 when the Chinese Ministry of Education passed a primary school reform decree after John Dewey's visit to China (Keenan, 1974). In 1989, the Chinese Ministry of Education also enacted Regulations for Kindergarten Education Practice designed to, among other things, emphasize "child-initiated activity" and "the importance of play" (Zhu and Zhang, 2008). Each educational reform era encountered problems with its implementation, partially because it contained elements of foreign methodologies.

Along with the challenges of implementing Western teaching methods in China, Chinese Montessori schools face unique obstacles. Many parents and children are turning their backs on the state-run education system, as it is based on repetition and limits critical thinking. While the traditional parenting style fits well with the current educational system in China, it can also stunt the self-driven learning process. Typically, Chinese parenting styles are very authoritarian and performance-driven (Shek, 2014). This strict parental control is comparable to that of Chinese education, as these schools are also authoritarian in the sense that they demand performance. State-run education in China emphasizes rote and habitual learning that leads to more regurgitation of information, as opposed to thought development and critical thinking practices. There are immense amounts of pressure on students to perform well in elementary school, as this determines which Junior High School you are admitted to (ICEC, 2015). With this importance placed solely on quantitative academic performance, students evolve into academic machines that are less likely to be self-driven in later stages.

To highlight this discrepancy between the two forms of education, similar studies designed to investigate the effects of early Montessori education were conducted in China. These researchers also concluded that Montessori education can promote development in a wide variety of areas, including gross motor skills, fine movements, language, and social behavior in children (何宏灵颜虹, 2009). Despite many challenges, Montessori schools have been increasing in



popularity in China, along with the rest of the world. Sources record an estimated 40 schools and 500 Kindergarten programs across China alone (Nylander, 2014). However, Montessori schools do not have as many resources or as much support in China. In the United States, there are approximately 500 publicly funded Montessori schools for grades K-6 (MontessoriPublic). Since there are no public Montessori schools in China, enrolled students pay tuition. The average cost of attendance for Montessori programs is roughly CNY 40,000 or (USD \$6,500) (Nylander, 2014). Montessori schools are generally more expensive per student as Montessori schools need to purchase many durable and expensive learning materials (Meinke, 2019). Despite many challenges for the growth of Montessori schools, roughly 200,000 students attend Montessori programs in China (Nylander, 2014).

Montessori education has existed and evolved for over one hundred years. As Dr. Montessori's methods continue to change the academic lives of millions around the globe, it is important to understand the process and history behind developing a new form of education. By allowing students to learn the way they do best, and having them set the social standards, Montessori education lays the groundwork to help student educational success. Chinese citizens who follow Montessori education have chosen to implement these methods all around the country, believing in its ability to raise prosperous, motivated young adults. In the next section, we will explore the direct impact this system has on participants in Montessori education, and compare them to traditional methods to explore the true lifelong effects of Dr. Montessori. In the next section, our team will explain our main objectives and our methodology behind achieving them.

### **3. Methodology**

Our group's main goal is to create materials (assets) that our sponsor school can use to educate the general public about the benefits, and experiences of the Montessori educational method, and its unique effect on children as they transition to adulthood. Inspired by our sponsor, Yimi's Children's House Montessori School, we are invested in finding real-life stories that support our research. To accomplish this, we created a weekly plan (reference Appendix A) and strategized some main objectives:

1. Evaluate and compare Montessori participant data to formulate an understanding of the effects Montessori education has on individuals.
2. Analyze and compare background information about the styles of Montessori and traditional education to provide a visual unbiased comparison of each.
3. Use the Montessori participant data to develop media-based assets that highlight the experiences of members in Montessori education.

In this methodology section, we will illustrate our approach to these objectives, as well as how we plan to correlate the data together to form a strong analytical, and rational understanding of the Montessori method, and its direct effects.

## **3.1 Methodology Based on Objective**

### **3.1.1 Objective 1: Evaluate and compare Montessori participant data to formulate an understanding of the effects Montessori education has on individuals.**

In this objective, our group is focused on the effect Montessori education has on students as they transition into their adult lives. We continue to explore the stages in each student's career, finding points in their education that made a significant difference in mindset, knowledge, or skills. To achieve this objective, our team compiled a few main points of interest to investigate: the educational value and growth through Montessori education, and personal growth as a result of Montessori education. To gather this information, we assembled an assortment of data acquisition tools. These include public surveys for Montessori participants (parents, teachers, and alumni), and well as interviews that will be used to collect testimonials and stories.

We first sought to contact current Montessori schools. By contacting Montessori schools in both the US and China, we hoped to work in close association with many organizations, and potentially recruiting participants for this study. However, due to the coronavirus and time constraints, we were unable to get any Montessori schools, aside from our sponsor's, to participate. Our first method was to conduct surveys. Questionnaires and surveys can help

acquire information from a larger population of people in Montessori education. These questions were much simpler than our interview question set and could be answered in a few words. This strategy of data collection allowed us to reach out to many more subjects to get their opinion. Our team wanted to obtain as many examples of individual feelings towards Montessori education as possible. We had hoped by using surveys would allow us to get enough qualitative data to make a general statement about the way students and teachers feel Montessori education has changed them. Unfortunately, we did not receive as many survey responses as we wanted. Reference Appendix B for examples of questionnaires/surveys. In current times, virtual platforms are preferable, so we made an easy online form that could be disbursed to anyone in an educational environment. Our team distributed these digital surveys to Montessori based school students (currently attending or attended in the past), and parents. Included in each survey was an optional form to fill out contact information for a follow-up interview. The analysis of the acquired data was as follows...

- Applied the average pool of answers to our research by comparing statistical survey data.
- Observed how our survey data differed from other researchers' experiments.
- Created a visual example of some of our data results in a table or graph.

The next method in our first objective is to gather real, conscious experiences of Montessori education. Guided interviews were used as an unequivocal information gathering method. Our guided interview strategy allowed us to gather the same information from each interviewee while leaving the interview open enough to let them bring up new topics that were a useful addition to our research (Jhpiego, 2020). This straightforward form of information helped our team compare the conscious experiences of the Montessori method with the raw research we gathered to truly understand these academic effects. Interviews were a realistic achievable asset that we could readily refer back to later to justify the important parts of our understanding. Our sponsor mentions "gathering real-life stories and testimonials", and this was a great way to achieve that request. In Appendix C, examples of interview questions we asked for students/alumni, teachers, parents, etc., can be found. Each interview was recorded, visually and auditorily, to be used for our deliverables. A video consent form and procedure for informed consent (Appendix D and Appendix E) was fully completed by all interviewees before any

visual, audio, or informative data was used in our research. Furthermore, a note-taker was present in each interview, highlighting and recording key elements of each interview. We gathered information from a total of 8 interview participants with 2 being from the U.S. and 6 from China. The 2 from the U.S. were alumni and the interview participants in China were 2 teachers, our sponsor headmaster, and 3 parents. Our group planned our interview method for a few main applications of our research:

- Interview data will be used as a reinforcement of current research.
- We will use the comparison of traditional and Montessori interview examples in our research to directly show the academic differences in students as they graduate towards adulthood see objective 2.)
  - Since we are using guided interviews, the questions asked to all Montessori participants will be the same, making it easy to categorize and compare the answers to each question in the interview.

### **3.1.2 Objective 2: Analyze and compare background information about the styles of Montessori and traditional education to provide a visual unbiased comparison of each.**

From our background information (secondary research sources), we identified methods and principles of traditional and Montessori education which we analyzed and compared with an infographic. We found that there are three major differences between Montessori and traditional education: learning style, teaching style and classroom environment. The infographic shows the information side by side in a clear format grouped by the three significant difference topics in an unbiased way. It also contains some basic information about each education system that will help the general population understand each education system.

This objective is meant to provide the sponsor with a visual asset that compares the education system we are working with, and the education system most used and understood today. As Montessori's leading competitor is broader mass, traditional education, our team felt it was important to arrange a proper understanding of each type of educational delivery method. With this asset, we provided the essential knowledge needed for a decision maker (such as a parent) to make their own decision about whether Montessori is right for their child's educational needs.

The comparison between these two educational methods is crucial to adding value to our project. One of the main problems surrounding our sponsor school is that Montessori education is generally frowned upon in the Hangzhou area, if not in China in general (Ms. Ge, personal communication, 25 October 2020). So, by providing a place on the sponsors website or building where parents/guardians can view an unbiased visual comparison of the differences between each, our team hopes to further intrigue individuals who would otherwise be unconvinced about the aspects of Montessori education.

### **3.1.3 Objective 3: Use the Montessori participant data to develop media-based assets that highlight the experiences of members in Montessori education.**

This third objective is oriented around the production of our final deliverables that will be given to our sponsor. These deliverables are an assortment of media, from text and pictures to video and audio. We delivered these assets in a package, along with a storyboard guideline for a webpage that our sponsor can follow to build a new section on their existing website. This storyboard will be a guide for an interactive webpage that makes accurate and valuable information on Montessori education accessible, and will also enable users to navigate the real life stories and testimonials of teachers, parents, and past students involved in Montessori education. Our sponsor is not limited to just building the webpage, as all of the video assets are standalone deliverables, and can be used on different social platforms (including WeChat) if they so choose.

While conducting our interviews -- the method to gather information and data from Objective one -- we video recorded the meetings that we had with the interviewees. This footage was used to create a total of seven subtitled and edited videos that detailed the experiences of each Montessori member. The interview footage may be used in an “interview spotlight” section that is laid out in the webpage storyboard. This section will host in depth backgrounds on the interviewee’s experience(s) in text, as well as the interview footage that shows them recounting their experiences.

Part of the package will be a deliverable that is a final storyboard template for our sponsor to develop a webpage (if they so choose) that matches our sponsor’s existing website (Appendix H). We consulted a couple professors, Leslie Dodson and Stephen McCauley, from the WPI Global Lab to help us determine the best way to put together this deliverable. They

suggested we make it interactive and include various media assets including the video recordings of our interviews. This webpage will be an interactive site that walks users through the experiences and stories of individuals who have participated in the Montessori education method, whether it be alumni, teachers, or parents of students enrolled in a Montessori school. With this information our deliverable can be used as a tool that can highlight the key aspects of each testimonial we received and show how Montessori education can affect individuals in their educational development. This emphasis on the testimonials of Montessori school alumni is important to our sponsor, as they are mainly interested in the recollection of these personal experiences told by those who experienced them. We then will group similar experiences and character traits that are desirable so that individuals who are curious may educate themselves on the topic of Montessori education. The sponsor may also choose to spotlight specific interviews on the web page if they find that they encompass all the aspects of Montessori education.

The final package will contain the complete webpage storyboard, all of the video media assets, text summaries of each interview (in English and Mandarin), as well as images for webpage embellishment. These images can be used in developing the potential webpage in a style and manner that matches the sponsor's existing website (Appendix I). Since the videos are standalone deliverables, this package is multi-faceted. Our sponsor is not restricted to only developing a web page; they can use the assets on any form of social media, as we learned the sponsor predominantly uses WeChat to distribute updates and information about their schoolhouse.

### **3.2 Challenges**

Our team ran into roadblocks along the path of our research. This section is aimed at highlighting those limitations. Firstly, we found it was generally difficult to find good interviewees that could provide value to our research due to the delays in communication and time constraints. Also, we find that protecting the privacy of every subject we use for our research is important so we only took the names of those comfortable. Each person we interviewed also signed a video recording and informed consent document (reference Appendix C & D to see the forms). As our project continued through term, our project plan and objectives needed to be changed as a result of the current pandemic (COVID-19 in 2020). Since multiple cultures work together on this project, we had some troubles with the existence of language

barriers and cross-cultural ethics that caused some roadblocks along the way. We first needed to rely on our HDU counterparts to handle any fieldwork needed to be done in Hangzhou, as we could not be there ourselves. Working around their schedule is something we had challenges with as they have less time and are 12-13 hours ahead of us. In addition, there were some small disagreements we had with the HDU team members on formatting and wording of some of our documents, but we were able to discuss and find a solution. All in all, we were able to overcome these obstacles and had a great experience working with the HDU team and working on this project with Yimi's Children's House Montessori School in Hangzhou.

The largest resulting hit to our team's productivity was that all of these struggles led to our deliverables being changed many times. Our initial web package started a full fledged website. Due to lack of communication with our sponsor, this idea was quickly changed to closely match the remaining time in the project. At this point in time, the site changed to an additional webpage we would add to the sponsor's existing site. Furthermore, communication with our sponsor did not improve, causing our deliverable to be set in a more general direction. This is what led us to our final media asset package. Here, it can be observed that a simple lack of close sponsor communication can send your project in many different directions. Our team's best advice for pursuing your deliverables, is to assert communication and updates with your sponsor as much as you can. If they do not communicate back, these are the measures you may expect to pursue in order to complete the IQP.

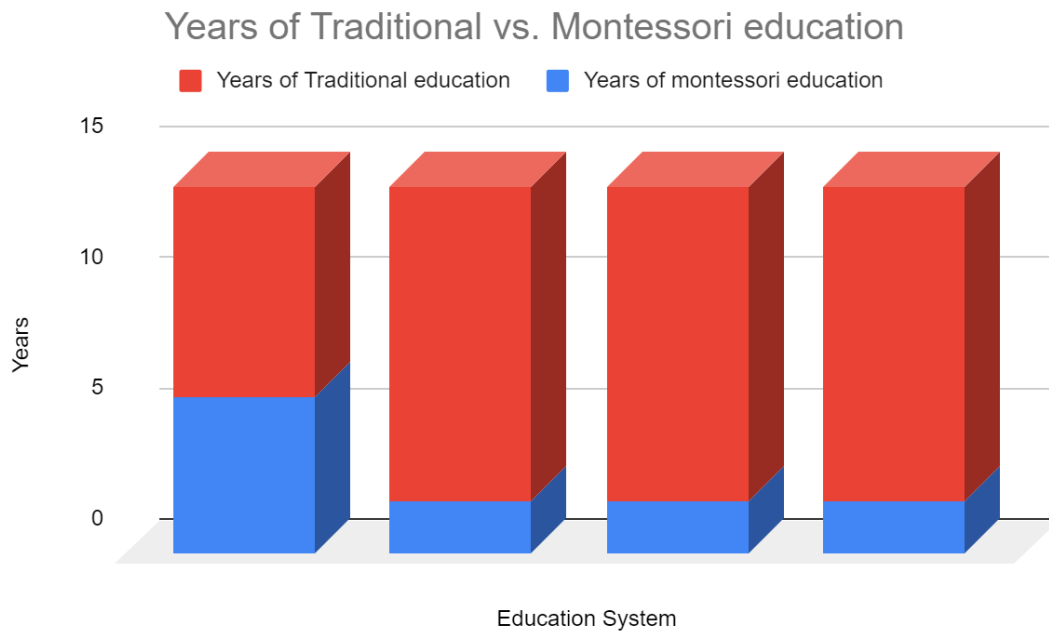
## 4. Findings

In this section, we present and analyze findings that result from our methodology. By ensuring the completion of each objective, our team was able to complete findings that we deemed essential in the overall completion of our research. As a result, our findings are based on our obtained results from our objectives. This includes: the analysis and comparison of interview and survey data from objective one, the traditional and Montessori educational comparison from objective two, and the effects of applying our research to a webpage deliverable from objective three.

In objective one, our team analyzed the conducted survey and interview data of participants in Montessori in both the U.S. and China to obtain a better understanding of how the effects we researched in our background section affected those individuals. For each interview participant type (parent, teacher, or alumni) we focused on highlighting key responses in relevant educational topics. This way, we could easily compare our findings to that of our previously conducted research.

From our surveys, we got four responses. From those, we were able to observe how many years of each education system each participant's response had and if it had any effect on their curiosity later in life. The first comparison, which can be seen in Figure 1, we made was between years of traditional and Montessori education to give us an idea of the average amount of years students attend each. Each column is a participant with the blue being years of Montessori education and red being years of traditional all stacked for the total years of education. All the participants went to traditional education after going to Montessori and for much longer than Montessori education. Almost all of our background research pointed to the idea that children who go through Montessori schools grow up to be more curious adults (Wu, 2019). However as seen in our Table 1, the participants who had the most Montessori education did not think of themselves as a curious person and were motivated in school by the need to get good grades. This contradicts the previous research found in our background section. Each row in the table represents a participant's information. However, all of this data is only based on four responses which is insubstantial to make good generalizations or evidence for our project.





**Figure 1.** Graph of students/alumni Years of traditional Vs. Montessori Education

Years of Montessori Education	Motivation in School
6	Need/want for good grades
2	Both curiosity for knowledge and need/want for good grades
2	Both curiosity for knowledge and need/want for good grades
2	Need/want for good grades

**Table 1.** Years of Montessori School Vs. Motivation in School

## 4.1 Teacher Participants

Firstly, we analyzed the teacher interview responses. Our HDU team in Hangzhou, China gathered two teachers from the sponsor school in order to gather valuable, local responses for our sponsor. This analysis was done by dividing the information into five major categories; Teaching styles, Montessori Principles, Traditional vs Montessori, Struggles/Problems with

Montessori, and Child Growth/Development. In our first section, teaching styles, we found that our participants were especially fond of the Montessori triad between the student, teaching, and environment. In many examples, our members stated that the teachers' communication with the child, the child's individual motivation to learn autonomously, and the environment's ability to attract the child to learn are all equally important (Elkind,1983). Our teacher participants exclaim that “Montessori says that independence is a person, and whomever cannot be independent can not be free”. This fashions the idea that Montessori truly does revolve around the autonomous development of the student (Marshall, 2017).

In Table 2, teachers characteristics are summarized, including how many years of Montessor teaching experience they have and how they became involved in Montessori education.

Participants	Years of Teaching Montessori School	How they became Involved in Montessori
Teacher 1(Zeng QiuBo)	8	Learned about Montessori when she was pregnant, gave up her then job and started teaching
Teacher 2 (Wu Xiuen)	13	Visited a Montessori classroom and was so impressed she decided to change careers

**Table 2.** Teacher Characteristics

Next, were the Montessori Principles identification. The teachers commonly state the morals and principals we identified earlier in our research. They proclaim concepts like “The first characteristic of Montessori education is that the student is respected when they are young, has a certain degree of freedom, has their own ideas, can express themselves freely, has more autonomy awareness”, and “The teacher should act as a guide, observer, and demonstrator in the environment” (Salassa, 2018). More replicated statements from those found in our background research could be found throughout the interviews. The teachers are passionate about following the principles behind Montessori, all of which revolve around the development of the individual.

This is backed by a quote from one of our anonymous teachers “children that are cultivated are independent, autonomous, focused, and self-disciplined” (Teacher 1, personal communication, 2020). Since Montessori education emphasizes not teaching, but more demonstration, “I do it, you see; then you do it, I observe” (Salassa, 2018). If the student is not guided into a motivated state, they will simply not be able to grasp the content provided by the proctors.

The next observed topic is the teachers exclamations about traditional vs Montessori education. In some ways, the teachers believe that traditional education and Montessori education has similarities and differences. The idea of having a teacher and sub-teachers to assist the students are present, however the teaching style differs greatly. While traditional sources all of the educational material straight from the teacher to all of the students, Montessori splits the educational material into sections, allowing the students to pick and choose how they learn each topic. In Montessori, it is also much more common for the teacher to observe the learning practice rather than enforce it like its traditional counterpart (Lopata, 2005). As the student develops their own strategies for learning, the teacher will observe to assure that this is effective for their educational growth “When we observe, we should see the children’s needs, and then cooperate with the major teacher in the classroom” (Teacher 1, personal communication, 2020).

Just as there are positive aspects in anything, there are also struggles and roadblocks that occur. We received some responses about the struggles of Montessori education. With the education method being so different, the teachers find it more difficult to cooperate closely with parents who may not fully believe in the methodology. Many are anxious that the Montessori methods do not properly prepare the child for the traditional environment, and more specifically, tests “many parents worry that Montessori is not enough to take the test, and then the child may not be able to compete with the children who receive the traditional kindergarten education, right?”(Teacher 2, personal communication, 2020). Their response to this was as follows “If a person can’t be independent, as many exam-oriented education has problems nowadays, the problem with exam-oriented education means that, for example, he may have poor self-care ability, he may not be able to live on his own, and may have high scores and low energy”(Teacher 1, personal communication, 2020). In summary they state that if one cannot explore education in a way they best understand, and even more so cannot be given a proper

examination of their ability in those skills, then how may they think for themselves more so in life? The idea of giving the same examination to every student, despite their different educational needs, is a principal Montessori refuses to follow. This is one of the greatest struggles for Montessori.

The final analysis of teacher participants in Montessori is their thoughts on child growth and development. Since Montessori is based around the individual's growth, every student is different. Their mind explores education in different ways, and in this sense, growth is unquantifiable. This concept was put into the best terms by one of our participants...

“Divide a person's growth into four stages, namely 0~6yr/o, 6~12yr/o, 12~18yr/o, 18~24yr/o. That is to say 0~6yr/o, first of all, what is the growth goal of children 0~6yr/o? Six year old children are like building a house and laying the foundation. The invisible part of the ground floor is actually more important than the visible part. The invisible part of the child, such as its independence, his concentration, his self-discipline, his ability to choose, being in a loving environment. The focus and development of these invisible aspects is important in Montessori. I believe it will be very helpful to him in his future life.” (Teacher 2, personal communication, 2020)

## **4.2 Parent Participants**

Secondly, our HDU team in Hangzhou China gathered three parents from both our sponsor school and local Montessori schools in the area. We then analyzed these parent interview responses. This was done by separating the interview responses into five categories: Child Improvement, Montessori vs. Traditional, Concerns/Worries, Montessori Assets, and Changes in Parents. In the first category, child improvement, many parents saw positive developments in their child's behavior in just a few weeks of enrollment. One child used to cry and feel uncomfortable when going to other kindergartens, but after starting to attend the Montessori school, the child would hardly cry anymore and would look forward to going to school (Parent 1, personal communication, 2020). Another child did not know how to tie their shoes, how to zip or wear pants even though their mother had shown them countless times. But after going to Montessori school for about a month, they were able to do that on their own and they were able to recite five to six poems by themselves (Parent 2, personal communication, 2020). This exemplifies how quickly Montessori education has an impact on its students.

In Table 3, various characteristics of the parents can be observed such as why they enrolled their child in Montessori education, how old their child was when they enrolled and how long they have been going or were in Montessori education.

<b>Participant</b>	<b>Why they tried Montessori education</b>	<b>How old and how long child enrolled in Montessori</b>
<b>Parent 1</b>	Montesori school was close by and heard good things about it	3 years old, enrolled for 2 months
<b>Parent 2</b>	Friend recommended Montessori education books, she read them and agreed with the philosophy	Started at 22 months old, enrolled for 48 months and counting
<b>Parent 3</b>	Sent child to a few traditional kindergartens but it did not work well, so decided to try Montessori	5 years old, enrolled for a month and counting

**Table 3.** Parent characteristics

The next category, Montessori vs. Traditional, parents made a few comparisons from their experiences from Montessori and traditional education systems. The overall consensus was that teaching styles cater to different parts of the child’s development where traditional “takes more care of children in their lives” and Montessori is generally focused on the child’s emotions, development and educational methods (Parent 2; Parent 3, personal communication, 2020). It also depended on what kind of person the parents were; typically “parents ... who are very concerned about the adaptation of their children should choose Montessori” and those who did not feel satisfied with their own traditional education experience would send their children to Montessori (Parent 3, personal communication, 2020).

The third aspect was concerns/worries which highlighted the worries parents had about their children going to Montessori school. The biggest concern for parents was how would their child perform transitioning into traditional school because it was so different. In Montessori education, there are no tests and therefore children do not develop the study habits they would need in traditional education (Parent 2, personal communication, 2020). In addition, children

typically have some obedience trouble transitioning into traditional education. However, if the child has a complete sense of self before going into traditional education, they will have very little trouble adapting to the new environment (Parent 3, personal communication, 2020).

Next, we examined the Montessori assets parents used to help them understand Montessori education. One parent read books such as (Maria Montessori (1982), *“Secrets of Childhood”*. **Ballantine Books**. ISBN-13 978-0345305831) and (Maria Montessori (1986), *“The Discovery of the Child”*. **Ballantine Books**. ISBN-13 978-0345336569) to learn about Montessori methods before enrolling their child in Montessori school. The same parent also recommended the books to other parents looking into Montessori schools (Parent 2, personal communication, 2020). One of the agreed upon setbacks of Montessori school is the tuition. It is a bit expensive and not all families can afford to send their children.

Finally, we asked about changes in parents after enrolling their children in Montessori education. Most parents found themselves engaging with their children differently as well as their own behavior changing. Parents put their children in engaging activities and improved their environment so that they could interact better with it. The parents also found a better understanding of themselves while trying to better understand their children, became more self-confident and found themselves (Parents 1, 2 & 3, personal communication, 2020). This illustrates that Montessori does not only have benefits for children, but adults as well.

### **4.3 Alumni Participants**

Our last interview group are alumni of Montessori education. The QPi team contacted alumni survey recipients who were interested in a follow up interview. Our interviewees were taken for two subset groups, college students who participated in Montessori and current working adults who learned in Montessori. This was one of the most important groups to analyze, so our team created many organizational topics to better understand the information; Enrollment, Creativity Encouragement, Social Skills, Transitioning to Traditional, Classroom Environment, and Personality.

Table 4 includes alumni interviewee characteristics including how many years they were enrolled in Montessori and if there was any difficulty transitioning into traditional education. .

<b>Participant</b>	<b>When/How Long They were Enrolled in Montessori</b>	<b>Difficulty Transitioning to Traditional?</b>
<b>Alumni 1</b>	Before kindergarten (Pre-K) for 2 years	Some difficulties
<b>Alumni 2</b>	Preschool and kindergarten for 2 years	No difficulties

**Table 4.** Alumni Characteristics

In our first observed topic, enrollment, we observed the commonalities of the time, and nature of their enrollment in Montessori. Our participants all enrolled for only a two year period, Preschool and Kindergarten between the ages of 4-6 years old. With this we were confident that our information between participants would be from similar aged experiences, therefore adding to the research compatibility.

We then evaluated responses related to the encouragement of creativity in Montessori. All alumni participants stated that they distinctly remember their Montessori environment influencing their curiosity and creativity. This correlates with the Montessori methodology of observing the student’s learning styles based around their individual strengths (Salassa, 2018). By using one's creative mind to solve problems, Montessori is able to bring about the autonomous learning capability in each student. “Montessori works off of your curiosity and creativity, so having that encouraged early on influenced that aspect of her mind to grow as she moved on from Montessori” (Alumni 1, Montessori Alumni, 2020).

Next, our team identified the key changes in each participant's social skills and interactions. In one case, the alumni had made many important relationships in Montessori, so much so that she had moved to the same traditional school after graduating. Due to the influence of group work sessions in Montessori, she felt comfortable work and interacting with others, even in a more traditional environment (Salassa, 2018).

It is important for this study and deliverable to analyze the difference between the Montessori method and the traditional methods; this finding will help to inform project

deliverables. In our interviews, our team received responses relating to their experience when transitioning to traditional school from Montessori. Our first interviewee proclaimed that her transition was not smooth. She had struggled with the straightforward aspects of traditional, and when using her creative outlets to solve traditional problems, she had found it was not enough to convince the teachers (Alumni 1, personal communication, 2020). In our other interview, the alumnus stated that while the educational difficulty did not change, the method and approach did. Interestingly, while she felt prepared for the traditional approach, the teachers also did not believe she was ready, and she was placed into programs that guided her towards the more straightforward path (Alumni 2, personal communication, 2020). However, in both cases, the alumni explained that while they transitioned to learning almost fully in the traditional method, they were able to apply the concepts they learned in Montessori to further better their understanding and approach of the content within their courses.

For the classroom environment, we asked our participants to explain how the classroom environment influenced their learning in Montessori. The common remarks stated that there is always a choice. Something in the environment around you would attract you to learning more about it, and your curiosity in such only added to the experience of learning. Time periods would allow you to explore more than one, eventually allowing you to learn from them all by the end of each day (Marshall, 2017). Our alumni exclaim that the classroom environment is constructed around what influences the individuals mind and supports their strengths as they move throughout the classroom.

Lastly, we researched how our interviewees' time in Montessori may have affected their personalities. The most relevant response was that because Montessori builds off of the personal strengths and aspects of each individual, that idea stuck with them the rest of their lives. The concept that they themselves are unique, and have their own interests and personalities influencing their decisions. As a result, one interviewee stated "I was a good student throughout my educational career. I was more inquisitive about certain things, and more likely to go against teachers ideas, and so I would challenge ideas. This was important in Montessori. To explore other paths, and be creative on your approach." (Alumni 1, Montessori Alumni, 2020).



## **4.4 Objective 2**

In analyzing the interviews from primary research and studies from secondary research, our team was able to arrive at some major comparisons that could be made between traditional and Montessori education. We found three major differences between Montessori and traditional education: teaching style, learning and classroom environment. These three dimensions of educational delivery are used to inform our general findings. Differences in any one topic can change the way that education method is effectively used to teach students. For our objective two, we researched each topic in both traditional and Montessori education, to find the exact differences that make both styles so different along these categories.

### **4.4.1 Teaching Style**

The first major finding between Montessori and traditional education is teaching styles. Montessori education teaching is child-centered, meaning the child dictates what and how they are learning, while traditional methods revolve more around its teacher's ability to teach many students simultaneously. Child-centered teaching encourages the students to be autonomous in their learning which cultivates their natural curiosities (Wu, 2019). Teachers interact with students individually to give concise, simple and objective lessons (Montessori, 1912). They should "have the quality of scientists, such as preciseness, earnestness, carefulness and accuracy" to be the best teacher they can be for the students (Mrs. Wu, personal communication, 2020). Montessori education has the best results when the parents are involved and follow the same teaching methods at home (Lau & Yau, 2015). Our sponsor school incorporates parents by offering parent workshops to help them understand how to effectively encourage their child's growth (Mrs. Wu, personal communication, 2020). Teacher-centered teaching is more structured, where children are taught specific topics a certain way in set class times. Traditional teachers are responsible for keeping order in the classroom and almost all educational value comes from them (Wu, 2019; Tan, 2016).

### **4.4.2 Learning Style**

The second significant difference is learning styles. Since Montessori education wants their students to be autonomous in their learning, they tend to become intrinsically motivated meaning they want to learn and do well because they personally enjoy it (Keith, 2014). Students

would get experiences by placing themselves in different friend groups to form an understanding of different perspectives . These students grow up to have a curiosity and hunger for knowledge (Keith, 2014). In traditional education, students are extrinsically motivated to learn and do well in school. This means that they are motivated to do well because they want to get good grades and increase their family's social and/or economic status. The students become strong in memorization, discipline, conformity and self-control (Li, Wang & Wong, 2011). While traditional students become remarkable in problem solving, they have trouble with the concept that there are multiple equally correct ways to get the right answer (Ma, 2020).

#### **4.4.3 Classroom Environment**

The final major difference is the classroom environment. In Montessori education, the classrooms are specifically made for children to interact with classmates and objects on their own time (Montessori, 1914). There are several different stations the children can choose to play at; for example a station where children can use varying size beakers to pour liquids into (Alumni 1, personal communication, 2020). There are large open spaces for the children to interact with objects, so the classrooms tend to be bigger than traditional classrooms (Montessori 1914). In addition to large indoor spaces, Montessori classrooms have outdoor spaces for different activities such as watching tadpoles grow into frogs (Alumni 1, personal communication, 2020). The classes are also made up of children of multiple ages. For example, children between three years old and six years old will be in the same room (Montessori Elementary..., n.d.). All the students are taught to clean up after themselves which creates a sense of responsibility and cultivates independence in the child (Mrs. Wu, personal communication, 2020). For example, if a child uses a cutting board to cut vegetables, they have to clean up after and arrange everything neatly so that it is not a mess for the next person. As they learn to do this, it becomes innate to them to clean and arrange their spaces. In traditional education, children do not interact with each other much during class time because the structure of the classroom is made so they pay attention solely to the teacher (Wu, 2019). Desks are put in rows, facing the front of the classroom so that the students focus on the lesson the teacher is teaching.

The following picture is of our infographic deliverable we gave to the sponsor. The sponsor can either print it out and hand them out or they can post it on their website or WeChat platform. We created both an English translation and a Mandarin translation (Appendix F) for

our sponsors convenience. The infographic contains a summary of all the previous information on differences between Montessori and traditional education in the three major categories of teaching style, learning style and classroom environment.

### **4.5 Objective 3**

After developing our webpage package and submitting it to our sponsor, our group was able to understand the effects of integrating our research data into a web-based format, as well as our findings from creating the media assets included in the package. We found that there was not substantial evidence or educational material about Montessori education that was easily accessible in China, and many individuals were wary of enrolling their children in Montessori education. We produced seven subtitled and edited videos of interviewees recalling their experiences after executing our methodology. We also discovered during the process of editing and developing these video-based media assets that most of these individuals were very passionate about their experiences with Montessori education, whether it be time spent in the classroom as a student or teacher, or a parent observing the development of their child. One parent said “In the process of learning, we also better understand ourselves” (Parent 3, personal communication, 2020).

## **5. Conclusions and Recommendations**

In this section, we draw conclusions on our objective deliverables based on our background research and methodology, and make recommendations to our sponsors to enhance the understanding and publicity of Montessori education. Firstly, we will introduce the significance between the stories in Montessori education from objective one, and our recommendations on how the sponsor can use these stories to enhance the public view on Montessori. Next, our team will introduce the importance between the different styles in both Montessori and traditional education from objective two. We will then formulate recommendations on how this information can be used to educate pupils interested in Montessori, and bring the greatest value to our sponsor. Lastly, we will discuss the effectiveness of the web based deliverable from objective three, and how it can be used to help the sponsor school. In addition, we will give our recommendations on how to use this tool effectively to attract, and inform potential Montessori participants of our sponsor school. Drawing these conclusions and recommendations is a way for our team to use our findings in a way that benefits the sponsor in the long term. It also helps guide our research's usefulness, and allows for further beneficial use after the project has been completed.

In objective one, we analyzed the interview responses from parents, teachers, and alumni in Montessori education to have testimonial data to compare to our background research. Overall, we found that in each section, the feelings and stories of our participants closely match to that of the research from secondary sources and studies.

### **5.1 Teacher Participants**

Firstly, we analyzed the teacher responses. This analysis was completed by grouping the information into five major categories; Teaching styles, Montessori Principles, Traditional vs Montessori, Struggles/Problems with Montessori, and Child Growth/Development. In each section we found common patterns from responses that closely correlate to our research on teachers in Montessori. In conclusion, teachers often focus on the development of autonomous learning within the individual. They do this by using the triad of student, teacher, and environment to influence self-confidence and personal growth (Marshall, 2017). The teachers all

exclaim that they love their time spent in Montessori, and enjoy experiencing the growth of the children as they rise to adulthood.

### *Recommendations*

Our interview results show an overall positive outlook on Montessori education and its ability to guide the student from the teacher perspective. Furthermore, by informing our team of their detailed experiences in Montessori, our team concludes that it is important for teacher's stories to be publicly known. Our team is convinced that the stories of the teachers who would guide people's children would help influence them to further trust this education system. The teachers in our study were truly passionate about promoting individual growth in every student within their school. Sharing these stories, either in text, or video would be an excellent way to show the passion behind the hearts of Montessori. This can be done by taking the assets found in the package, and using them to effectively show the different educational elements of Montessori. For example, they could post a meaningful quote from one of the interviews, and then upload the recorded interview to be viewed and observed. They can use the different elements of the webpage in other ways to create mini WeChat pages, each containing their own WeChat participant. Many combinations of the provided media assets are available to gain value from social sites like the sponsor webpage, WeChat, or social media.

## **5.2 Parent Participants**

Next we analyzed the parents interview responses by categorizing them into five topics: Child Improvement, Montessori vs. Traditional, Concerns/Worries, Montessori Assets, and Changes in Parents. We found that the parents who choose to send their child to Montessori education either had educated themselves on Montessori methods and agreed with them or they had an average experience in traditional education and wanted their child to have a chance at a better experience. A lot of the parents see great improvements in their children in a short period of time and even positive developments in their own behavior. However, parents are still worried about the transition to traditional from Montessori though if their child has a complete character before they change schools, the child will have no trouble adapting. Overall, parents had positive experiences and thoughts about Montessori school.

### *Recommendations*

From our parent interview responses, we can observe that parents greatly benefit from sending their children to Montessori education. This information corresponds with the research that states parent involvement in school achievement has a positive effect on the children as well as the parents (Driessen, Smit & Sleeper, 2005). We recommend publishing testimonies that appear in our deliverables and videos. It will help other parents understand the immense benefits of Montessori education and consider it as an option for their children.

### **5.3 Alumni Participants**

Our last interview group are alumni of Montessori education. This was one of the most important groups to analyze based on sponsor requests, so our team used many organizational topics to better understand the information: Enrollment, Creativity Encouragement, Social Skills, Transitioning to Traditional, Classroom Environment, and Personality. In this study, our team focused on uncovering memories about Montessori from each participant; this was not always an easy exercise given the amount of time that elapsed since their Montessori attendance. Then, we guided the participants by using questions that helped them think about how they may have directly affected their lives.

In all cases, participants spent two years in Montessori, for preschool and Kindergarten. In summary, the participants reported that Montessori encouraged their creative and curious outlets. In this way, they felt that their inquisitive nature as a child influenced them to learn more about what they saw in their environment, not just in school, but outside of school as well. Due to this strategy, they found themselves constantly motivated to learn about things they were curious about. When transitioning to a traditional schooling method later on, they exclaimed that their motivation to learn from the Montessori education did not change, although the method of teaching them did. As a result, the students were able to transition, but more so by applying their own educational mindset to their work. This gave them an inquisitive mindset as they proceeded throughout their education. Their personality would always have a sense of curiosity, and the will to learn more about the ideas and concepts that interested them.

### *Recommendations*

In our experience with Montessori so far, it seems that this education method is often frowned upon not because of its methods of teaching, but rather due to its ability to prepare children to move to a traditional educational environment. It is important to understand that the morals and concepts that children learn in Montessori gives them a state of mind that motivates them to always learn more. By expressing the experiences of past pupils in Montessori, skeptics may be able to better understand how this method supplies the individual with a self-motivated mindset before entering traditional schools. While the methods of education may be different, Montessori's methods focus less on the importance of learning the actual subjects directly, but rather influence the concept of curious thinking and problem solving at such a young age—learning to learn and motivation to learn. These ideas only continue to evolve as the student better learns how to apply them to improve their subject understanding all around. It is crucial to make it understood to those interested in Montessori, that the goal is to promote this aspect of their educational mindset.

For our objective two, we gathered information about the differences between Montessori and traditional education and put them into an infographic. We recommend that the sponsor either print them out and post them on buildings or post them on their WeChat platform or website. This will provide the general public with some basic information on Montessori education. From the information we collected for our infographic, we came up with a few recommendations for parents looking into schools and any people involved with the Montessori education system. For parents, both traditional and Montessori schools are good education systems, however it depends on what traits the parents would like in their children and their financial capability. Parents should also educate themselves on some of the principles and methods of Montessori before deciding whether or not to enroll their child in it. All Montessori schools in China are private and tuition cost is relatively high so parents must personally feel it is worth it.

For those running Montessori schools, we recommend to actively educate the general public on Montessori education. One of the topics to be covered to the general public is the transition between Montessori to traditional school. From our research, it is the main concern parents have about enrolling their child into Montessori. They are afraid that their children will not learn the study habits needed in traditional school and that they will have difficulty

transitioning into traditional school. It is imperative to reassure them that the transition may be a little hard but will not be detrimental to the child.

For our final methodology step, objective three, we used our field data to develop media assets (Appendix F through I) that can be used in developing a webpage that our sponsor can add to their existing website. Based on our findings mentioned above, we recommend that individuals curious about Montessori education and individuals interested in our sponsor's school be directed to their website or WeChat. Here they can find unbiased information and testimonials of individuals who experienced Montessori education, from video recorded interviews, to long answer survey responses. We believe that this form of media distribution (web-based) is highly effective, as it is very accessible and easily distributable. If the sponsor decides to add to their website, we highly recommend the integration of a web developer who has experience in making effective use of marketing and media assets. The provided package has everything one would need to provide the sponsor with outlets to effectively inform others about Montessori education using stories and testimonials.

Since the webpage is not currently integrated into our sponsor's website, it is impossible to ascertain the outcomes from these deliverables. In that case, we speculate that this format will positively affect our sponsor's growth, and increase web traffic on their website. We believe that the spread of information and "reviews" will decrease the skepticism towards Montessori education, and parents will be less afraid of their children being unable to compete in a traditional education setting if they attend Montessori education first. Not only do we recommend that the website be reproduced, but we highly recommend that a web developer be hired to assist in the reproduction and integration of the webpage into the existing website. That way, the webpage will be fully functional and errors will be minimized. We also suggest that the webpage developer be tasked with revamping the existing website, as it appears that the current website has not been updated in recent years. We also encourage that our sponsor increase their outreach by establishing a social media presence, and link those services to their website as well. That way, our sponsor will be able to reach an even broader group of people who are potentially interested in Montessori education.



## References

- Akresh, R. (2018). Long-term and Intergenerational Effects of Education : Evidence from School Construction in Indonesia. National Bureau of Economic Research.
- American Montessori Society (2020) History of Montessori: Who was Maria Montessori?  
<https://amshq.org/About-Montessori/History-of-Montessori/Who-Was-Maria-Montessori>
- Cui, Y., Lei, H., & Zhou, W. (2018). Changes in School Curriculum Administration in China. *ECNU Review of Education*, 1(1), 34–57. <https://doi.org/10.30926/ecnuoe2018010103>
- Denervaud, S., Knebel, J., Hagmann, P., & Gentaz, E. (2019, November 21). Beyond executive functions, creativity skills benefit academic outcomes: Insights from Montessori education. Retrieved September 11, 2020, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6874078/>
- Dohrmann, K. R., Nishida, T. K., Gartner, A., Lipsky, D. K., & Grimm, K. J. (2007). High School Outcomes for Students in a Public Montessori Program. *Journal of Research in Childhood Education*, 22(2), 205–217. <https://doi.org/10.1080/02568540709594622>
- Driessen, G., Smit, F., & Slegers, P. (2005). Parental Involvement and Educational Achievement. *British Educational Research Journal*, 31(4), 509–532. <https://doi.org/10.1080/01411920500148713>
- Elkind, D. (1983). Montessori Education: Abiding Contributions and Contemporary Challenges. *Young Children*, 38(2), 3-10. Retrieved September 11, 2020, from <http://www.jstor.org/stable/42721000>
- ESOL Observation Protocol Form. (n.d.). Studylib.Net. Retrieved October 14, 2020, from <https://studylib.net/doc/7148737/esol-observation-protocol-form>
- Europe 2020 indicators—Poverty and social exclusion. (2020). Eurostat. <https://ec.europa.eu/eurostat/statistics-explained/pdfscache/29306.pdf>
- ICEC | What Is the Chinese Educational System Like? (2015, May 5). *ICEC*. <http://www.icecusa.org/what-is-the-chinese-educational-system-like/>
- Jhpiego (2020). Tools Studying Regulatory Context: GuidedInterviews, 1-2. Retrieved October 6, 2020 from [http://reprolineplus.org/system/files/resources/05\\_ToolsStudyingRegulatoryContext\\_GuidedInterviews.pdf](http://reprolineplus.org/system/files/resources/05_ToolsStudyingRegulatoryContext_GuidedInterviews.pdf)

- Keith, R., & Saint Mary's College of California. (2014). Learning as Development: Reflections of Former Montessori Students (No. 3641394). Saint Mary's College of California. [keithhttps://pqdtopen.proquest.com/doc/1622146910.html?FMT=AI&pubnum=3641394](https://pqdtopen.proquest.com/doc/1622146910.html?FMT=AI&pubnum=3641394)
- Lau, D., & Yau, R. (2015). From Zero to Infinity: Montessori Parent Education in Hong Kong and Greater China. *Montessori Life: A Publication of the American Montessori Society*,27(1), 34-41.
- Lillard, A. S., Heise, M. J., Richey, E. M., Tong, X., Hart, A., & Bray, P. M. (2017). Montessori Preschool Elevates and Equalizes Child Outcomes: A Longitudinal Study. *Frontiers in Psychology*, 8, 1783. <https://doi.org/10.3389/fpsyg.2017.01783>
- Lillard, A., Else-Quest, N. (2006, September 29). Evaluating Montessori Education. *Science Magazine*, 313(5795), 1893–1894. <https://science-sciencemag-org.ezpxy-web-p-u01.wpi.edu/content/sci/313/5795/1893.full.pdf>
- Li, H., Wang, X. C., & Wong, J. M. (2011). Early Childhood Curriculum Reform in China. *Chinese Education and Society*,44(6), 5-23. doi:10.2753/CED1061-1932440601
- Lopata, C., Wallace, N. V., & Finn, K. V. (2005). Comparison of academic achievement between Montessori and traditional education programs. *Journal of Research in Childhood Education*, 20(1), 5+. [https://link-gale-com.ezpxy-web-p-u01.wpi.edu/apps/doc/A137871936/PROF?u=mclin\\_c\\_worpoly&sid=PROF&xid=be2c1a5f](https://link-gale-com.ezpxy-web-p-u01.wpi.edu/apps/doc/A137871936/PROF?u=mclin_c_worpoly&sid=PROF&xid=be2c1a5f)
- Ma, Y. (2020). Navigating and Comparing Chinese and American Education Systems. In *Ambitious and Anxious* (pp. 78–108). Columbia University Press; JSTOR. <https://doi.org/10.7312/ma--18458.7>
- Maria Montessori (1982), “Secrets of Childhood”. Ballantine Books. ISBN-13 978-0345305831
- Maria Montessori (1986), “The Discovery of the Child”. Ballantine Books. ISBN-13 978-0345336569
- Marshall, C. (2017). Montessori education: A review of the evidence base. *Npj Science of Learning*, 2(1), 1–9. <https://doi.org/10.1038/s41539-017-0012-7>
- Medina, C., & Cardona, L. (2010). The Effects of Remittances on Household Consumption, Education Attendance, and Living Standards: The Case of Colombia. *Lecturas de Economía; Medellín*, 72, n/a.

- Meinke, H. (2019). Exploring the Pros and Cons of Montessori Education. (n.d.). Retrieved December 21, 2020, from [https://www.rasmussen.edu/degrees/education/blog/pros\\_cons\\_montessori\\_education/](https://www.rasmussen.edu/degrees/education/blog/pros_cons_montessori_education/)
- Montessori Elementary Classroom Experience. (n.d.). Retrieved November 19, 2020, from <https://amshq.org/About-Montessori/Inside-the-Montessori-Classroom/Elementary>
- Montessori, M. (1912). *The Montessori Method*. New York: Frederick A. Stokes Company.
- Montessori, M. (1914). *Dr. Montessori's Own Handbook*. New York: Frederick A. Stokes Company.
- Montessori Public. (n.d.). Public Montessori. MontessoriPublic. Retrieved October 2, 2020, from <https://www.montessoripublic.org/public-montessori/>
- Pate, R. R., O'Neill, J. R., Byun, W., McIver, K. L., Dowda, M., & Brown, W. H. (2014). Physical activity in preschool children: Comparison between Montessori and traditional preschools. *The Journal of School Health*, 84(11), 716–721. <https://doi.org/10.1111/josh.12207>
- Per capita U.S. Real Gross Domestic Product (GDP) 1990-2019. (n.d.). Statista. Retrieved September 25, 2020, from <https://www-statista-com.ezpxy-web-p-u01.wpi.edu/statistics/248133/per-capita-us-real-gross-domestic-product-gdp/>
- Rate of high school dropouts U.S. 2018. (n.d.). Statista. Retrieved September 25, 2020, from <https://www-statista-com.ezpxy-web-p-u01.wpi.edu/statistics/1120199/rate-high-school-dropouts-us/>
- Salassa, M. (2018, March 20). Teachers Who Do Not Teach. *To Be a Teacher in the Montessori Elementary Learning Environment*. Retrieved September 11, 2020, from <https://czasopisma.ignatianum.edu.pl/eetp/article/view/1090/1096>
- Schmidtke, C., and Peng C. “Philosophy of Vocational Education in China: A Historical Overview.” *Journal of Philosophy of Education*, vol. 46, no. 3, 2012, pp. 432–448., doi:10.1111/j.1467-9752.2012.00859.x.
- Shek, D. T. L., & Sun, R. C. F. (2014). Parenting in Hong Kong: Traditional Chinese Cultural Roots and Contemporary Phenomena. In H. Selin (Ed.), *Parenting Across Cultures: Childrearing, Motherhood, and Fatherhood in Non-Western Cultures* (pp. 25–38). Springer Netherlands. [https://doi.org/10.1007/978-94-007-7503-9\\_3](https://doi.org/10.1007/978-94-007-7503-9_3)

Tan, C., & Hairon, S. (2016). Education Reform in China: Toward Classroom Communities. *Action in Teacher Education*, 38(4), 315–326. <https://doi.org/10.1080/01626620.2016.1226205>

UN Human Rights. (n.d.). <https://www.un.org/en/sections/issues-depth/human-rights/>

Wu, M. (2019). A Comparative Research Study of Student-Teacher Relationships in Elementary School in China and America. *Major Papers*, 87. [https://scholar.uwindsor.ca/major-papers/82/?utm\\_source=scholar.uwindsor.ca%2Fmajor-papers%2F82&utm\\_medium=PDF&utm\\_campaign=PDFCoverPages](https://scholar.uwindsor.ca/major-papers/82/?utm_source=scholar.uwindsor.ca%2Fmajor-papers%2F82&utm_medium=PDF&utm_campaign=PDFCoverPages)

Zhu, J., & Zhang, J. (2008). Contemporary trends and developments in early childhood education in China. *Early Years*, 28(2), 173-182. doi:10.1080/09575140802163584

何宏灵颜虹, & HE Hong-Ling, Y. H. (n.d.). 蒙氏教育法对2~4岁儿童智力发育的影响. *中国当代儿科杂志*, 11(12), 1002–1005.

# APPENDIX

## Appendix A

### Montessori IQP Plan

#### Montessori IQP Plan

Task	PQP	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Interview and testing preparations	✓	✓	✓	✓				
Surveys and Questionnaires		✓	✓	✓				
Conduction of Interviews			✓	✓	✓	✓		
Comparison of Results					✓	✓	✓	✓
Creation and finalization of project						✓	✓	✓

# Appendix B

## SURVEY/QUESTIONNAIRE QUESTIONS FOR STUDENTS/ALUMNI



### Alumni/Student Survey

---

How long were you enrolled in Montessori education? Which years? \*

How long were you enrolled in traditional education? Which years? \*

Did you enjoy going to school? \*

Do you consider yourself a curious person? How does Montessori encourage your curiosity? \*

Do you enjoy learning? What aspects of learning are the most enjoyable for you? \*

What school year had the greatest impact on your educational journey? Can you explain a specific memory or experience you had during this school year? \*



Now create your own JotForm - It's free! [Create your own JotForm](#)

What was your favorite subject and why? Did the class offer you anything unique that you didn't find in other academic settings? \*

Are you more motivated by your curiosity for knowledge or by your need/want to do well in school (grades)? \*

- Curiosity for knowledge
- Need or want for good grades
- Other

Would you be open to doing an interview for our project on the effects of Montessori education in China? \*

- Yes
- No

If you answered yes to the previous question, please provide us with some contact information so we can get in touch with you.


Submit



Now create your own JotForm - It's free!

Create your own JotForm

# SURVEY/QUESTIONNAIRE QUESTIONS FOR PARENTS (YES/NO/SHORT ANSWER)



### Parent Survey

What prompted you to send your child to a Montessori School? \*


Has Montessori education made parenting your child any easier? Any different? \*

What aspects of your child's life changed the most since their start in Montessori education? \*

If another parent was thinking of enrolling their child in a traditional school, would you suggest Montessori instead? If so, what would you say to convince them? If not, why? \*

Has Montessori education directly affected you in any way? If so, how? \*

Would you be willing  Yes

 Now create your own JotForm - It's free! [Create your own JotForm](#)



effects of Montessori education? \*

If you answered yes to the above question, please provide your email address so we may contact you regarding the interview.

Submit



Now create your own JotForm - It's free!

[Create your own JotForm](#)

# Appendix C

## INTERVIEW QUESTIONS FOR ALUMNI

### ALUMNI/STUDENT INTERVIEW PLAN

Interviewee:

Interviewee Organization:

Interviewee Position:

Date of Interview: TBD

Location: TBD

Interview Facilitator: HDU Student

Interview Scribe(s): HDU Student

Purpose of Interview: To gain an increased understanding of the effects of Montessori education from the perspective of past and current students.

### INTRODUCTION

We are the group responsible for representing WPI in the Interactive Qualifying Project for the Hangzhou project center. Our group is researching and observing Montessori education, as well as its effects on students as they transition into adulthood.

How are you building rapport?

Initial explanation of project goals and what is to be gained from this interview. Explain how we are interested in their personal stories and experiences from their time in Montessori education.

Less talking more listening

### QUESTIONS

Write out at least 5 open ended questions here (with justification). Think carefully about the flow of your questions.

QUESTION 1: How long were you enrolled in Montessori education?

Justification: General question to get the interviewee comfortable and so we have some background information on them.

QUESTION 2: When you switched from Montessori education to traditional education (or vice versa), what was the most challenging about the change? (ONLY APPLICABLE TO MONTESSORI STUDENTS)

Justification: In our report, we will likely be presenting information to readers who are unaware of what Montessori education is. It may be helpful to understand what aspects were so different that the student was challenged during their transition.

QUESTION 3: Are there any main takeaways you could share about your experience?

Justification: A large portion of our project is discovering the effect that this education method has on students as they mature. If anyone would know about life changing stories, it would be those who were students under this method.

Probe: What specific memories could you share?

QUESTION 4: How academically prepared did you feel moving on from the Montessori/traditional education method?

Justification: This question will be used to loosely gauge how effective these two forms of education are based on personal experience.

QUESTION 5: Did Montessori education change you personally?

Probe: How did you grow as a person as a result?

Justification: Our project is centered around how Montessori education affects children development, so it is crucial to ask if these students are able to identify any changes that they personally noticed.

QUESTION 6: What strengths do you feel Montessori has over other educational options?

JUSTIFICATION: Again, this interview is focused on gaining personal insights and testimonials from students who are/were enrolled in Montessori education. This question aims to highlight what each student feels the key strengths of Montessori education are that make it so unique.

QUESTION 7: How was your experience with education after graduating from Montessori?

**JUSTIFICATION:** This question helps to isolate any differences between other forms of education and Montessori education, as Montessori is typically an early form of education. By asking this question, we can further understand how a student feels in both learning environments.

**PROBE:** What are your future career interests? Do you think Montessori had any influence on those interests?

## **CLOSING**

Thank Interviewee.

Inform them of what will happen after the interview.

Provide contact information if they need to contact you about the project.

Is there anything you wanted to add to your answers from previous questions?

Is there any question you have for us?

Thank you for your time and thoughtful/thorough answers.

After this interview, we plan to review your answers and see how we can add to our proposal. We may have more questions at a later date.

If you have any questions at a later point in time, please feel free to contact us at this email: [gr-hduwpimontessori@wpi.edu](mailto:gr-hduwpimontessori@wpi.edu)

Or our DingTalk group: <https://c.tb.cn/k4.IxUaV>

## **INTERVIEW QUESTIONS FOR TEACHERS IN MONTESSORI EDUCATION**

Teacher/Faculty Questions

Interviewee:

Interviewee

Interviewee Position:

Date of Interview:

Location:

Interview Facilitator: HDU Student

Interview Scribe(s): HDU Student

Purpose of Interview: To gain important information about Montessori education, as well as gaining insight on teacher perspectives on Montessori education.

## INTRODUCTION

We are the group responsible for representing WPI in the Interactive Qualifying Project for the Hangzhou project center. Our group is researching and observing Montessori education, as well as its effects on students as they transition into adulthood.

How are you building rapport?

Initial explanation of progress and talk about why we are interested in the project as well as our goals.

Less talking more listening

**QUESTION 1:** How long have you taught in Montessori education?

**Probe:** Have you ever taught in a traditional academic environment?

**Probe 2:** Elaborate: Could you compare your experiences of the two? How do they differ exactly?

**Justification:** It is good to have an understanding of how long a teacher has been in the field, to further compare how their experiences correlate with the amount of time they have spent in Montessori education. Also, this question allows us to observe some of the differences between traditional and Montessori methods.

**QUESTION 2:** What elements of Montessori education do you feel have the greatest effect on their learning experience?

**Justification:** Helps us identify the main sources of impact the Montessori uses in their system.

**QUESTION 3:** What aspect of Montessori education do you like the most? And why?

**Justification:** Most teachers have a love for what they do. Understanding what part of this methodology teachers like the most, will help us understand the most effective methodologies that Montessori uses.

**QUESTION 4:** Can you think of any students in particular that excelled, and if so, where are they now?

**Justification:** By giving us an example of a specifically excelling student, we may better understand how Montessori education influences learners to autonomously learn, and strive to excel in their learning.

**Probe:** What did this student do differently to guide themselves on their educational journey, to set themselves up for such success? Does every student have that potential in the Montessori method?

## **CLOSING**

Thank Interviewee.

Inform them of what will happen after the interview.

Provide contact information if they need to contact you about the project.

Is there anything you wanted to add to your answers from previous questions?

Is there any question you have for us?

Thank you for your time and thoughtful/thorough answers.

After this interview, we plan to review your answers and see how we can add to our proposal. We may have more questions at a later date.

If you have any questions at a later point in time, please feel free to contact us at this email: [gr-hduwpimontessori@wpi.edu](mailto:gr-hduwpimontessori@wpi.edu)

Or our DingTalk group: <https://c.tb.cn/k4.IxUaV>

## **INTERVIEW QUESTIONS FOR PARENTS OF MONTESSORI STUDENTS**

### **Parent Questions**

Interviewee:

Interviewee Organization:

Interviewee Position: Parent of a Montessori student/Alumni

Date of Interview: TBD

Location: TBD

Interview Facilitator: HDU Student

Interview Scribe(s): HDU Student

Purpose of Interview: To gain an increased understanding of the effects of Montessori education from the perspective of past and current students.

## INTRODUCTION

We are the group responsible for representing WPI in the Interactive Qualifying Project for the Hangzhou project center. Our group is researching and observing Montessori education, as well as its effects on students as they transition into adulthood.

How are you building rapport?

Initial explanation of project goals and what is to be gained from this interview. Explain how we are interested in their personal stories and experiences from their time in Montessori education.

Less talking more listening

## QUESTIONS

QUESTION 1: What originally gave you the idea to send your child to a Montessori School?

Justification: We get an understanding of what draws parents to Montessori education.

QUESTION 2: Has Montessori education made parenting easier in any way?

Justification: We can see if there's a positive change in the child's behavior as well as if the Montessori parenting techniques work (when applied).

QUESTION 3: What aspects of your child's life changed the most from the beginning of their time in Montessori, to present?

Justification: We can see how much a child's behavior changes, whether positive or negative. And see if the amount of time a child is in Montessori education affects the amount of change.

QUESTION 4: If another parent were thinking of enrolling their student in traditional schooling, how might you persuade them to consider Montessori. What would you say?

Justification: We can get a sense of what appeals to parents the most and possibly get an argument to help persuade China's general public to enroll in Montessori education.

QUESTION 5: In what ways has Montessori directly affected you?

Justification: We can get a sense of the effect of Montessori education on the parents; if it changes their parenting style or anything else.

## **CLOSING**

Thank Interviewee.

Inform them of what will happen after the interview.

Provide contact information if they need to contact you about the project.

Is there anything you wanted to add to your answers from previous questions?

Is there any question you have for us?

Thank you for your time and thoughtful/thorough answers.

After this interview, we plan to review your answers and see how we can add to our proposal. We may have more questions at a later date.

If you have any questions at a later point in time, please feel free to contact us at this email: [gr-hduwpimontessori@wpi.edu](mailto:gr-hduwpimontessori@wpi.edu)

Or our DingTalk group: <https://c.tb.cn/k4.IxUaV>



# Appendix D

## Informed Consent

### Video Consent and Release Form

Without expectation of compensation or other remuneration, now or in the future, I hereby give my consent to the WPI Montessori IQP Research Team, its affiliates and agents, to use my image and likeness and/or any interview statements from me in its publications, advertising or other media activities (including the Internet).

This consent includes, but is not limited to: (Initial where applicable)

\_\_\_\_\_ - (a) Permission to interview, film, photograph, tape, or otherwise make a video reproduction of me and/or record my voice;

\_\_\_\_\_ - (b) Permission to use my name; and

\_\_\_\_\_ - (c) Permission to use quotes from the interview(s) (or excerpts of such quotes), the film, photograph(s), tape(s) or reproduction(s) of me, and/or recording of my voice, in part or in whole, in its publications, in newspapers, magazines and other print media, on television, radio and electronic media (including the Internet), in theatrical media and/or in mailings for educational and awareness.

This consent is given in perpetuity, and does not require prior approval by me.

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Address: \_\_\_\_\_

Date: \_\_\_\_\_

The below signed parent or legal guardian of the above-named minor child hereby consents to and gives permission to the above on behalf of such minor child.

**Signature** of Parent  
or Legal Guardian: \_\_\_\_\_ **Print Name:** \_\_\_\_\_

*The following is required if the consent form has to be read to the parent/legal guardian:*  
I certify that I have read this consent form in full to the parent/legal guardian whose signature appears above.

\_\_\_\_\_  
Date

\_\_\_\_\_  
**Signature** of Organizational Representative or Community Leader





## **Appendix E**

### **Procedure for obtaining informed consent for interviews**

#### **(1) Disclosing to potential research subjects information needed to make an informed decision**

It is important to us that we verify that each individual we gather data from via interview or survey has an understanding behind why they are contributing to our research. Their opinions, experiences, and stories will be encouraged.

#### **(2) Facilitating the understanding of what has been disclosed**

The participants will always be made aware if any of their information is used for our research or data collection. Research subjects are allowed to inquire about their statements, or ask for them to be removed from the research at any time.

#### **(3) Promoting the voluntariness of the decision about whether or not to participate in the research**

It is crucial that each subject understands that they are willing to make their free decision to participate in the data collection at any time. In no way should our team sway/affect the mindset of any participant, either to avoid their input, or forcefully make them allow us to collect data from them.

**(A written document stating these procedures for informed consent will be provided to each attending subject in our research (Find in Appendix D). Data collection can only be set forth after the subject has signed and agreed to the conditions stated.)**



# Appendix F

## Montessori vs. Traditional Education Infographic

Montessori IQP
http://www.yimihome.org/
蒙特梭利研究计划
http://www.yimihome.org/

### Montessori vs Traditional

### 蒙特梭利或传统

<b>Montessori</b>	<b>Traditional</b>	<b>蒙特梭利</b>	<b>传统的</b>
<p><b>Large, open-concept classrooms that leave space for creative learning outlets.</b> All elements are child-sized, as to allow the students to move and interact with the objects as they please.</p> <p><b>Often, Montessori schools are designed to feel like a home.</b> This is to create the perception of a safe environment, in which children feel a sense of similarity and connection with something they are already used to. In addition, children ages 3-6 years old can be found engaging in the same classroom.</p> <p><b>Child-centered learning means that the child chooses what and how they learn.</b> Children freely learn throughout the classroom as the teacher maintains behavior. The teacher steps in when needed. Individual interaction with each student is common.</p> <p><b>Montessori methods are applied at home, to guide the child in the same way at all times.</b> In this fashion, methods taught by parents and teachers will not be mixed. By enforcing Montessori throughout the child's entire day to day schedule, Montessori continuously builds on its ability to inhibit self-guided learning.</p> <p><b>Autonomous learning means that the child is encouraged to be self-motivated in their studies.</b> Allowing them to choose their learning method intrinsically motivates the student to learn on their own.</p>	<p><b>Classroom</b></p>	<p><b>More systematic classroom environment.</b> Seats are placed in rows facing the proctor. All students are of the same age group in each classroom.</p> <p><b>Educational visual elements are used for reference.</b> In traditional education, many schools employ the use of wall decorations that may be used for student reference when in class. It is uncommon to have hands-on interactive elements.</p> <p><b>All course material is provided and taught directly by the teacher.</b> Students all learn the same topic simultaneously, the same way.</p> <p><b>School life and home life are considered separate.</b> Children will not overlap their home life with education and will attend and apply concepts of each separately.</p> <p><b>Students are encouraged to learn to set topics in the same learning style as others.</b> This learning style extrinsically motivates children to perform from discipline and memorization.</p>	<p><b>课堂</b></p>
<p><b>宽敞且无隔间的教室为创造性的学习方式提供了空间。</b>教室内所有物件大小都与儿童相匹配，能够让孩子们遵循自己的意愿来自由操作或与之互动。</p> <p><b>一般而言，蒙式幼儿园的设计更有“家”的温暖。</b>这样的精心安排是为了让孩子们获得十足的安全感，使他们建立起教室与熟悉事物之间的关联。此外，蒙式幼儿园还将3-6岁的孩子们安排在同一教室一起工作。</p> <p><b>以儿童为中心的学习意味着孩子们能够自主选择学习内容和学习方式。</b>在老师们的引导下，他们能够在教室的任何地方自由学习，老师们只会在必要时适当介入，与每个学生单独互动。</p> <p><b>将蒙特梭利教育方法应用于家庭之中，使得家长能够在任何时候以同样的方式引导孩子。</b>这样，家长和老师的教育理念就不会再被混淆。而且，通过制定每日计划实施蒙特梭利教育方式，可以避免孩子漫无目的的学习。</p> <p><b>“自主学习”强调鼓励孩子在学习自我激励。</b>允许他们选择喜欢的学习方法，从本质上激励学生自主学习。</p>	<p><b>Teaching Style</b></p>	<p><b>中规中矩的课堂环境。</b>座位面向老师排列。每个教室的学生年龄相同。</p> <p><b>以各种视觉内容作为参考。</b>在传统教育中，许多学校将核心教学内容制作成墙壁装饰，供学生在课堂上参考。可以动手操作的互动元素非常少见。</p> <p><b>所有的课程材料都是由老师直接提供并且讲授的。</b>学生们以同样的方式同时学习同样的内容。</p> <p><b>校园生活与家庭生活分离。</b>孩子们的家庭生活与教育不会重合，他们需要以不同的方式应对这两种截然不同的环境。</p> <p><b>鼓励学生以相同的方式学习已被设定好的学习内容。</b>这种学习方式强调外部的激励手段，通过反复训练和记忆来获得更好的学习成果。</p>	<p><b>教学风格</b></p>
<p><b>自主学习”强调鼓励孩子在学习自我激励。</b>允许他们选择喜欢的学习方法，从本质上激励学生自主学习。</p>	<p><b>Learning Style</b></p>	<p><b>自主学习”强调鼓励孩子在学习自我激励。</b>允许他们选择喜欢的学习方法，从本质上激励学生自主学习。</p>	<p><b>学习方法</b></p>

# Appendix G

## Quotes and pictures



# Appendix H

## Storyboard

**SCHOOL LOGO**

**SMALL FLOWERS**

**BIG FLOWERS**

**Ms Xiaomei Wu**

**MS WU FULL INTERVIEW**

**MS XIAOMEI WU TEXT**

In the interview with the headmaster Wu, she recalls how she got into Montessori education and what prompted her to create the school, as well as her philosophy on Montessori methods. She also answers some of the major concerns parents have about sending their child to Montessori schools, such as how well do the children transition into a traditional school, what happens if a child is extremely intelligent, and how well do the children learn. Throughout the entire interview, she is passionate and driven about her work with the children. She has seen many children develop into independent, responsible adolescents and hopes to continue to make a positive impact on more children and families in the future.

**INTERVIEWS**

**TEACHERS**

**TEACHERS TEXT**

**TEACHERS FULL INTERVIEW**

In this interview, two teachers from the school give their stories about how they became involved in Montessori education and how it has impacted their lives. They talk about how passionate they are about teaching children in a way that cultivates the child's independence. The teachers state that the children are not the only ones learning, but they are as well. By observing the children interact with the classroom objects, the teachers learn better ways to learn about their own environment and how to give more concise and helpful feedback.

**ALUMNI**

**QUOTE 2**

"IN THE PROCESS OF LEARNING, WE ALSO BETTER UNDERSTAND OURSELVES."

**PARENTS**

**PARENT 1**

**PARENT 1 TEXT**

**PARENT 1 FULL INTERVIEW**

This parent was very impressed with the effects of Montessori education. After a month of Montessori school, their child began taking initiative in actions and the parent could see the child's confidence grow. As a result, the parent did not have to continuously help the child in daily tasks.

**PARENT 2**

**PARENT 2 FULL INTERVIEW**

**PARENT 2 TEXT**

This parent had Montessori school recommended to her by a friend and then she read books on the Montessori methods. She decided that the possible benefits of Montessori education outweighed the tuition cost. Her child also greatly improved his habits after attending Montessori school.

**PARENT 3**

**PARENT 3 TEXT**

This parent sent their child to a few traditional kindergartens but none of them ended in working well so she decided to send him to Montessori school. After a month, the parent felt more self-confident and so did the child. So much so, that the child began trying to do things himself because he enjoyed the feeling of satisfaction and accomplishment.

# Appendix I

## Web Package Files



Package Videos



Pictures



Quotes



Text Files



Pictures



Quotes



Storyboard  
Mandarin



Storyboard



Text Files