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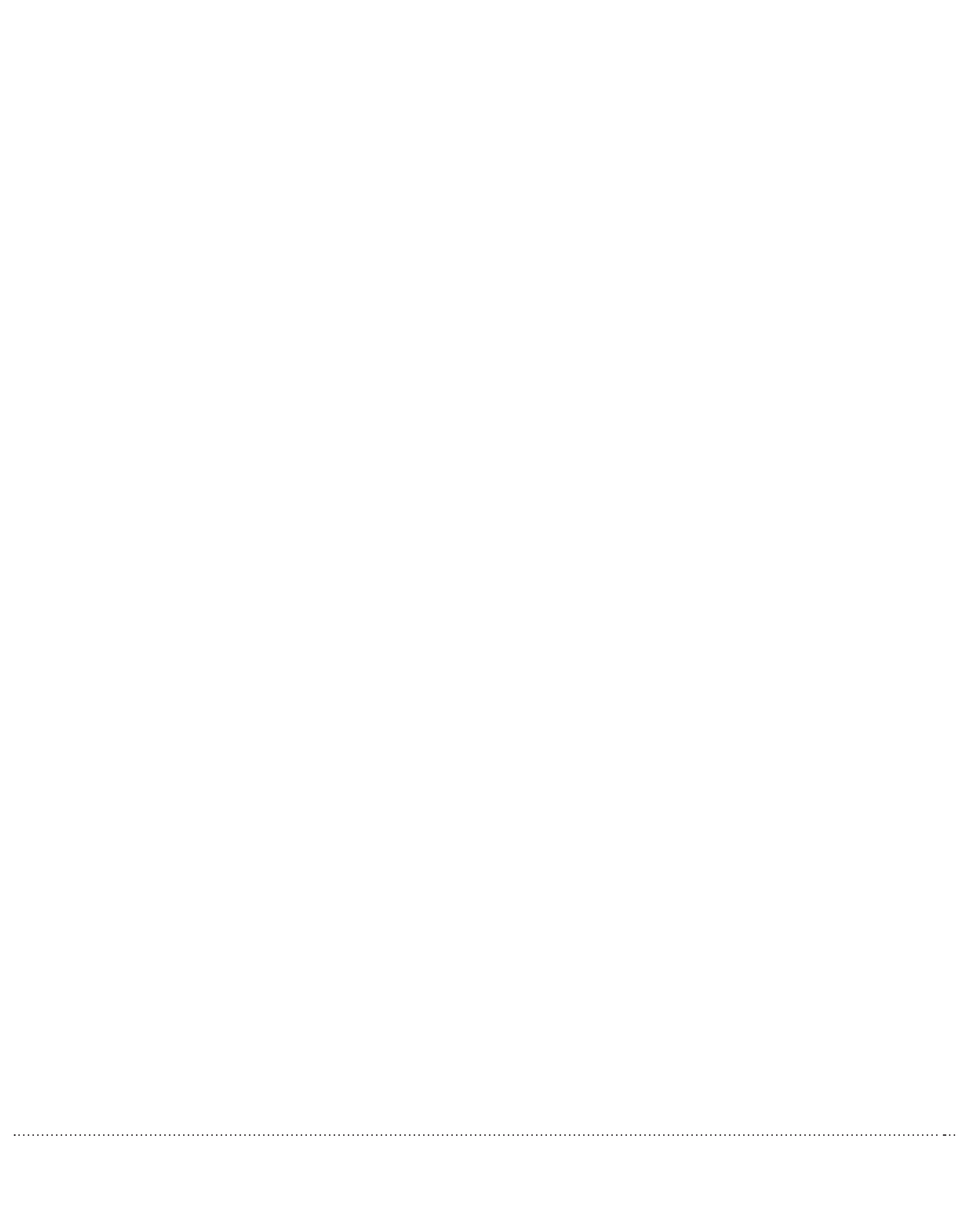
# Journal of Montessori Research

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December 2022

## From the Editor

We are pleased to share the fall 2022 issue of the *Journal of Montessori Research*, even though it is a bit later than usual. Our publication is experiencing many of the same challenges experienced across academia in the postpandemic era. Researchers are reporting increasing levels of stress and pessimism, along with reduced access to resources to support their research publication efforts (Stuart et al., 2022\*).

Despite the delay, this is an excellent issue with articles that will be valuable to the field. The first two articles provide important data for better understanding the state of Montessori education today. The first article reflects a collaborative effort, led by Mira Debs and guest edited by Katie Brown of the National Center for Montessori in the Public Sector, to develop a global Montessori census offering an up-to-date estimate of the number of Montessori schools around the globe, along with other insights about publicly funded schools and definitions of Montessori education across borders. The second article, by Toby Long and colleagues, specifically focuses on data regarding children with disabilities served in Montessori programs based on a survey of the current enrollment of children with disabilities in U.S. Montessori Early Childhood programs.

The second half of this issue connects Montessori practices to contemporary educational theory and practice. In the third article, Bernadette Phillips examines the commonality between core principles and recommended practices of the Neurosequential Model in Education (NME) and those of the Montessori Method. Finally, this issue concludes with our second book review, authored by John Broome of Purdue University. This review introduces the Montessori research community to the new Playbook by the National Center for Montessori in the Public Sector and Philip Yenawine, *Visual Thinking Strategies in Montessori Environments*.

We are already preparing for an outstanding spring 2023 issue, with several manuscripts under consideration. Finally, as the end of the year approaches, I encourage any of you who are engaged in Montessori research to consider joining or renewing your [membership](#) in the American Educational Research Association (AERA) and the Montessori Education Special Interest Group (SIG).

Sincerely,



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\* Stuart, C., Neuman, K., & Truant, R. (2022). The impact of the COVID-19 pandemic on perceived publication pressure among academic researchers in Canada. *PLoS one*, 17(6), e0269743.





# Global Diffusion of Montessori Schools: A Report From the 2022 Global Montessori Census

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*Keywords:* Montessori census, Montessori research, global education, alternative pedagogy

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**Abstract:** Montessori education is distinct for its implementation in 154 countries around the world. Lacking a Montessori trademark or comprehensive overseeing body, the expansion of the Montessori approach has often been diffuse and fragmented among competing organizations. The absence of centralized, accurate, and consistent accounting has made it difficult to document the scope, growth trends, and diverse populations of students served in Montessori schools. The primary objective of this study was to gather evidence to support a robust estimate of the number of Montessori schools worldwide. This estimate relies on national and regional organizations' broadest definitions of what constitutes a Montessori program. The study included two components: a survey of regional and national Montessori organizations and supplemental sources, including other published estimates and direct inquiries within key countries. Multiple sources allowed for triangulating data to reach a more confident estimate for the number of schools in each country and for synthesizing global perspectives on significant elements of Montessori fidelity worldwide. Through these sources, we document a total of 15,763 Montessori schools around the globe, roughly 9% of which are government funded. Countries with the largest number of Montessori schools are the United States, China, Thailand, Germany, Canada, and Tanzania; the United States, Thailand, the Netherlands, and India have the largest number of government-funded or public Montessori programs. Results of the fidelity analysis identified six practices that emerge consistently as central pillars of Montessori implementation.

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Montessori education is a distinctive educational pedagogy that is internationally implemented in 154 countries globally (Association Montessori Internationale [AMI], 2020). The Montessori approach spread rapidly around the world after the early success and international acclaim for Maria Montessori's first *Casa dei Bambini* in

Rome in 1907 (Whitescarver & Cossentino, 2008). In some places, schools initially grew as a result of training courses conducted by Montessori. In other places, passionate educators established Montessori schools after attending Montessori's training abroad, and in still other places missionaries and other charitable organizations

carried Montessori education into the Global South (Debs, in press). In these ways and others, Montessori seeds were globally spread: Schools were developed, and an educational movement took root. With such diverse paths of diffusion, however, Montessori education grew with little centralized organization, and no single supervising entity monitored school growth or quality.

At the same time, the lack of a Montessori trademark or a comprehensive overseeing body also means that implementation of the approach has adapted over time to local contexts, resulting in divergence between contemporary Montessori organizations that do not fully recognize others' interpretations of what constitutes Montessori education (Murray & Daoust, in press). Furthermore, the fragmented nature of Montessori growth complicates efforts to better understand issues of globally equitable access. Without accurate and consistent accounting, it is impossible to understand the reach, growth trends, and diverse populations of students served in Montessori schools.

In this study, an international research team begins addressing the information gap by creating the 2022 Global Montessori Census. This study included two components: (a) a survey of regional and national Montessori organizations to collect information in each country on the estimated number of Montessori schools, the extent to which Montessori programs are government supported, and the way in which Montessori schools are defined and (b) supplemental sources, including other published estimates and direct inquiries with contacts in key countries to obtain additional school count estimates by country. Supplemental data allowed us to triangulate multiple sources to reach a more confident estimate for each country. This analysis enables us to answer the following questions: What is the best estimate for how many Montessori schools exist in each country, what is an estimated total count of Montessori schools globally, to what extent are Montessori schools supported by government, and how are national Montessori organizations defining Montessori education in their respective countries?

## Literature Review

The fact that any school can use Montessori in their name regardless of the degree to which they follow Montessori practices is an overarching challenge when obtaining an accurate accounting of schools, and this problem has deep roots in the unique history and current

landscape of Montessori education. These roots begin with the legacy and history of Montessori, continue with issues of defining current Montessori practices, and ultimately affect the field through difficulties in employing a widely accepted definition for research purposes. After addressing these uniquely Montessori challenges, we conclude the literature review with a discussion of previous efforts to count the number of Montessori schools along with similar census efforts related to other alternative education approaches.

### Legacy of Montessori and Diverging Views on Defining Montessori Education in Practice

As Montessori's educational ideas began to spread and she became a popular public figure in the early 1900s, Montessori faced the challenge of public enthusiasm straining her ability to supervise efforts undertaken in her name and to maintain the authenticity of her approach. It seems likely that, even with a primary objective of quality control, her independent role outside of a university setting required her to also consider the financial implications of protecting her intellectual property (Kramer, 1976/1988).

Historians and authors have described the complicated relationships between Montessori and her proteges, as even her closest followers often became estranged (Guttek & Guttek, 2016). Since the years of the first Children's House, Montessori organizations have emerged, blossomed, and often split over philosophical disagreements about what it means to be a Montessori school (Kramer, 1976/1988; Povell, 2009). This legacy of conflict between growth and authenticity remains a fundamental aspect of Montessori education today (Murray & Daoust, in press). The result is a complex and often disconnected patchwork of Montessori organizations around the world with varying degrees of adherence to Montessori's original ideas. Pedagogical preferences of individual educators and the realities of the geographic settings and cultural contexts in which they operate contribute to this complexity.

The disconnectedness of the Montessori community leads to the absence of a universally accepted international governing body. Even so, the AMI, established by Montessori in 1929 and maintained by her son Mario Montessori, is presently among the oldest Montessori organizations and is currently the organization with the widest international scope (Quarfood, in press). AMI maintains an extensive network of Montessori organizations around the world.



### **Defining Montessori for Research Purposes**

The ambiguity in what Montessori education entails results in different ways of implementing Montessori education (de Brouwer, 2022; Lillard & McHugh, 2019; Marshall, 2017; Murray & Daoust, in press). In fact, there are no legal protections for the name, so any school can call itself a Montessori school without applying any Montessori principles, which leads to considerable variability in how Montessori education is practiced in different schools (Lillard & McHugh, 2019). The very complexities that necessitate a comprehensive census such as this to account for Montessori schools around the world lead to challenges in determining what criteria will be used to identify schools as implementing Montessori education.

Even in studies on Montessori education, researchers have varying definitions of what constitutes Montessori education. Although more attention is now paid to the question of Montessori fidelity in research, most studies have ignored the differences in Montessori implementation and suggest that all schools express Montessori education in the same way (Murray & Daoust, in press). Research into the effectiveness of Montessori education is therefore difficult and often unclear because it is not determined in advance how and to what extent the Montessori schools participating in the research apply Montessori principles. For example, Macy et al. (2021, p. 1036) define Montessori education as a “strong focus on child-directed learning,” in line with Denervaud et al.’s (2021, p. 1) definition where Montessori education is defined as “self-directed and uninterrupted learning activities that children perform within multi-age classes.” These definitions are essentially different from Livstrom et al.’s (2018, p. 191) definition, which describes Montessori education for adolescents as “multidisciplinary and contextualized in real-world problem solving and project-based learning and inquiry.” One problem with these these definitions is that they focus on the setting where Montessori education is being implemented, ranging from Early Childhood to Secondary schools, which results in varying definitions of Montessori education.

To overcome the problem of the ambiguity in the definition of Montessori education, most studies describe Montessori’s historical background or Montessori key principles (e.g., Marshall, 2017). Some studies illustrate both, such as Gasco-Txabarri and Zuazagoitia (2022) defining Montessori education as the following:

*The Montessori method, considered a nonconventional teaching method, is characterized by recognizing the interest and needs of students, allowing their personal choice; reinforcing self-motivated, active and autonomous, as well as collaborative, learning by mixing students of different ages; facilitating the manipulation and understanding of materials; developing self-control; respecting freedom and teaching responsibility; encouraging creativity; avoiding extrinsic motivation; not rewarding success; and encouraging trial-error techniques in tasks, among other characteristics. (p. 2)*

Such definitions still vary across studies, resulting in challenges in comparisons across schools and determining standard end results.

In the Montessori community and across research, the challenge of defining Montessori education and determining which schools are practicing it makes the effort to develop a census of Montessori schools a significant challenge, which we discuss in the Methods section.

### **Counting Montessori and Other Alternative Pedagogies**

Recognizing some of the underlying challenges in developing a uniform definition of Montessori schools, efforts have occurred internationally and in the United States to find common ground and to collaborate to tally the number of Montessori schools. Globally, this effort was led by the AMI cooperating with several Montessori organizations to create a 2006 estimate of 22,000 Montessori schools around the world as part of a celebration of the centenary of Montessori’s birth (AMI, 2021), although country-specific documentation was available for only two countries, the United Kingdom and Australia (AMI, 2006). In 2020, AMI reported Montessori schools being found in 148 countries (AMI, 2020).

Similarly, American Montessori organizations have begun an ongoing collaboration, producing and maintaining a national count of Montessori schools through a Montessori organization—the National Center for Montessori in the Public Sector (NCMPS)—formed in collaboration with several existing Montessori organizations. The U.S. Montessori census was launched in 2013 as a collaboration with the National Center for Montessori in the Public Sector, the Center for

Research on Developmental Education, and multiple Montessori organizations within the United States. Funding was initially provided by the Trust for Learning, and NCMPS now maintains the database with ongoing efforts at improving data collection and communication (NCMPS, n.d.). A total of 2,728 Montessori schools have participated in the U.S. Montessori census to date (NCMPS, n.d.); of these schools, 579 are publicly funded programs. The U.S. Montessori census offers school leaders the opportunity to maintain and update their own information. This effort assists researchers, policymakers, and parents in learning about Montessori both nationally and in their communities.

The Center for Guided Montessori Studies (CGMS), a U.S.-based online training program affiliated with the Montessori Foundation, developed a Global Montessori Schools census resource that is composed of a listing of individual schools that call themselves “Montessori” (CGMS, n.d.). The organizations acknowledge that the database is limited because no evidence of authenticity is included and because their process of locating schools relies on internet searches and existing lists that are unlikely to be complete (M. Seldin, personal communication, July 13, 2022). Other countries have lists of affiliated schools shared online, but no rigorous global accounting of Montessori schools currently exists (see, e.g., Montessori Aotearoa New Zealand, 2022; Opera Nazionale Montessori, n.d.; South African Montessori Association, n.d.).

Other alternative educational approaches maintain records about the schools around the world implementing their pedagogy and the organizations that represent them. Often, these organizations are smaller or have more centrally organized structures. For example, the International Baccalaureate (IB) organization authorizes member schools and provides a website with “facts and figures” about IB schools and programs around the world; the organization estimates around 3,600 programs as of 2020 (IB, 2020). The Waldorf Worldwide organization provides a complete list of schools and teacher training centers around the world, which allows an easy accounting of the program’s reach through 1,857 schools in 70 countries (Waldorf Worldwide, 2022). Ascertaining the number of schools implementing a Reggio Emilia–inspired approach is more difficult because clear standards and criteria for what constitutes such schools is perhaps even less defined than for Montessori education (Landi & Pintus, 2022). The Reggio Emilia Approach has organized an international network of representatives with established programs

and reports to have affiliations with around 30 centers worldwide, although it is unclear how many schools exist globally (Reggio Emilia Approach, 2022). The North America Reggio Emilia Alliance is currently conducting its own census project but reports 1,200 individual members, including educators and advocates (North American Reggio Emilia Alliance, 2022). Similar efforts to consolidate information about Montessori schools and organizations globally is much more complex because of the number, diversity, and regional overlap of Montessori institutions.

## Methods

Findings reported in this article are based on multiple data sources with two primary components: a survey of regional and national Montessori organizations and supplemental sources, including other published estimates and direct inquiries within key countries. This section outlines the methodological aspects of these data sources.

### Survey of Montessori National and Regional Organizations

To answer our research questions, we relied first on responses from representatives of national Montessori organizations. We developed an original Qualtrics online survey to obtain estimates of the number of schools and the degree of government support along with additional information about the organizations and Montessori education in their respective countries or regions (Appendix A). In asking organizational representatives to provide initial country-level estimates of the number of Montessori schools based on the way they define them in their countries, we recognize that some variations from country to country and across organizations may occur. More discussion about variation in defining Montessori education across countries is provided in the subsequent Survey Development section. The survey was English language–based and relied on national organizations and schools with email access, which potentially limited the participation of non-English speaking educators and may have undercounted grassroots organizations.

### Survey Development

A primary focus of the survey was obtaining a count of Montessori schools; we decided to be as inclusive as possible in defining the criteria to be counted, recognizing that Montessori practices vary by organization and across countries. This approach is consistent with the

“wide-tent” approach of the AMI’s global census in 2006. Therefore, the survey asked Montessori organization representatives, “What is the estimate of the total number of Montessori schools in your organization’s primary country, regardless of whether they are currently members of your organization? (Please use the broadest definition for what you consider to be Montessori schools.)” Other components of the survey addressed information describing the various ways of associating with the national organization, involvement of nongovernmental organizations in operating Montessori schools, availability of government-funded schools, and the number of teacher training programs. A list of reported survey questions is available in Appendix A.

**Survey Distribution**

Working with AMI and their extensive network of international contacts, we developed a list of 201 regional and country Montessori organizations and researchers operating in 154 countries. The initial invitation to complete the survey was distributed by AMI to only 192 individuals because nine of the original 201 email addresses were invalid and the invitation could not be delivered. AMI sent three email reminders to participate, and subsequent outreach was conducted through three additional attempts via email by a member of the research team. We intentionally emailed the survey to multiple Montessori organizations in each country when possible

to triangulate estimates within countries.

**Survey Response Rate**

Eighty-one representatives from Montessori organizations completed the survey, which represents 59 countries and reflects a 42.2% response rate. Table 1 lists the countries for which organizations responded to the survey.

**Supplemental Data Sources**

We leveraged supplemental data sources for two distinct purposes. First, we identified data sources to supplement the country count data for countries where we had missing or conflicting information from the survey. Second, we incorporated data from national Montessori organizations worldwide to understand the ways in which they define quality Montessori practices. Details about our approach to these two supplemental data sources follow.

**Supplemental Data for Country Counts**

Expanding on the data obtained in the survey of national and regional Montessori organizations, we also triangulated data from several additional data sources to fill in missing information and to verify the count estimates. As of 2022, the U.S.-based Center for Guided Montessori Studies Global Montessori Schools census included 8,686 schools worldwide (CGMS, n.d.). The

**Table 1**  
*Countries Represented by Survey Respondents*

Europe	Africa	Middle East	Asia	Oceania	North & Central America	South America
Albania	Algeria	Lebanon	Armenia	Australia	Canada	Argentina
Austria	Ethiopia	Pakistan	Azerbaijan	New Zealand	Haiti	Brazil
Belarus	The Gambia	United Arab	Brunei		Honduras	Colombia
Bulgaria	Ghana	Emirates	Darussalam		Mexico	Chile
Estonia	Kenya		China		United States of	Paraguay
France	Morocco		India		America	
Germany	Nigeria		Indonesia			
Greece	South Africa		Japan			
Italy	Tanzania		Malaysia			
Latvia	Tunisia		Mongolia			
Netherlands	Uganda		Russian			
Norway	Zimbabwe		Federation			
Poland			Thailand			
Portugal			Vietnam			
Romania						
Slovenia						
Spain						
Switzerland						
Turkey						
United Kingdom						
of Great						
Britain and						
Northern						
Ireland						

CGMS census is a publicly available list updated every several years that includes self-reported Montessori schools without verifying Montessori fidelity. The CGMS staff rely on internet searches and organizational connections to locate Montessori schools to conduct outreach for marketing purposes. In addition, we incorporated counts from the U.S. Montessori census, which is maintained and updated annually by the National Center for Montessori in the Public Sector and provides a breakdown of private and publicly funded Montessori programs (NCMPS, n.d.).

Finally, when we were aware of the existence of Montessori schools within a country where we had no counts from the survey or other census sources or those sources differed significantly, we contacted local researchers for an informed estimate and to gauge the degree of government support for Montessori schools. In some cases, we incorporated counts provided by authors of country profiles for Bloomsbury's *Handbook of Montessori Education* (Debs, in press) or national Montessori association websites when available. We supplemented information from 12 additional contacts in specific countries.

### **Supplemental Data for Montessori Practices**

To better understand the implications of the broad approach that we used in defining what constitutes a Montessori school, we examined the variability or consistency in the Montessori definition and practice across countries by comparing a sample of 14 national and regional Montessori organizations around the world to see how they define a Montessori school. We consulted the following organizations in countries with a significant Montessori infrastructure to have a sample from different regions of the world: South African Montessori Association, International Montessori Foundation, American Montessori Society, AMI-USA, Montessori Public Policy Initiative, Organização Montessori do Brasil, Montessori for Kenya, Indian Montessori Foundation (affiliated with AMI), Indian Montessori Centre, Montessori Mexico (affiliated with AMI), Montessori Deutschland, Montessori Australia, Montessori Aotearoa New Zealand, and Montessori Europe (for a list of organizations and their links, see Appendix B).

### **Analysis**

Arriving at the estimates of the number of Montessori schools in each country required more complex analyses because multiple data sources were

involved. Details of the analysis process are detailed separately for the single-source data and the triangulated data in the two sections that follow.

### **Single-Source Data Analysis**

Analysis of survey data involved descriptive statistics, including means, standard deviations, and frequency counts of the 81 responses using IBM Statistics v. 28. The Montessori practices data from the 14 organizational sources listed in Appendix B were collected and sorted in Microsoft Excel to identify themes and common criteria across the organizations. This analysis provided the basis for the discussion of Montessori practices in the Results section and informed the items included in the survey related to Montessori practices.

### **Triangulation Process**

We describe the multiphase process of estimating the counts of Montessori schools in individual countries in the following paragraphs. First, we cross-checked country number counts from survey responses with the CGMS census along with estimates from our outreach efforts. We gave more weight to estimates that came from more well-documented sources or when the figure was based on an explicit list. In a number of cases, we obtained different Montessori school count estimates from multiple organizations in the same country and, in several cases, significant differences between different members of the same organization. Wide variation on country counts occurred for Canada, China, Japan, Kenya, Nigeria, and Turkey. In these cases, we created a country estimate that was roughly the midpoint of all the estimates, with more weight given to higher quality data sources. In some locations, such as Tanzania and Canada, we took the midpoint of several estimates, but the Turkey and China examples provide context for understanding the types of challenges we faced for some countries.

In Turkey, an initial survey respondent gave an estimate of 3,000 Montessori schools in the country. Additional outreach gave us estimates of 500–700 schools, 50–150 schools, and a list of 49 Montessori schools considered to be of high quality (which included a note that several schools call themselves Montessori schools without significant connections to the pedagogy). Based on the additional contextual information from the outreach, we ultimately made a generous estimate of 300 Montessori schools in Turkey.

We also had a wide range of estimates in China, which highlighted the importance of understanding local country context, particularly in a changing policy

landscape. A training institute estimated a low figure of 200 Montessori schools in China, a national Montessori association estimated 1,000 schools, an educator at a training center estimated 1,000–1,300, and a Montessori researcher on China estimated 5,000–6,000 schools based on her data collection efforts. The landscape of Montessori education in China is changing rapidly; the Chinese government is enforcing tuition caps and providing subsidies for preschools attached to local housing communities, which has led to curriculum regulation and the conversion of several Montessori preschools to traditional preschools (A. Chen, personal communication, September 7, 2022). Given this uncertain policy landscape, we ultimately estimated 1,100 Montessori schools in China, a figure that needs additional monitoring and revision as the landscape changes.

Another important goal for this census project was to gauge the degree of governmental support for Montessori schools around the world. Yet, as was the case with estimates of the total number of Montessori schools in a country, significant variation in responses about government-funded or public Montessori programs also occurred. The discrepancies may have reflected some combination of varying country contexts and unclear wording of our question. When we asked, “How many Montessori schools in your primary country are government funded?” we intended to refer to schools that receive their full funding from government sources, but respondents may have interpreted this question to mean private schools that receive some degree of government funding.

To develop an estimate about the number of Montessori schools receiving full government funding, we incorporated information from the supplemental data sources along with the survey responses to also triangulate estimates of government-sponsored Montessori programs.

## Results

The Results section is divided into three parts. The first part provides findings that address the primary question about the number of schools in existence worldwide, along with the degree of government-supported schools. The second part provides more in-depth analysis from the survey responses about their organization’s structure and the extent of Montessori teacher education programs. The third part includes a synthesis of Montessori practices described by national

and regional Montessori organizations worldwide who responded to the survey, along with an analysis of leading international Montessori organization perspectives based on their websites.

### Global Count of Montessori Schools

Recognizing that our data collection efforts may be limited and that several countries may be undercounted, in this 2022 Global Montessori Census, we document a total of 15,763 Montessori schools around the globe using our triangulated data sources, and we estimate that roughly 9% of these are fully government funded. Countries with the largest number of Montessori schools are the United States, China, Thailand, Germany, Canada, and Tanzania; the United States, Thailand, the Netherlands, and India have the largest number of government-funded or public Montessori programs. As is evident in Figure 1, Montessori education has spread worldwide, with concentrations in large countries on almost all continents. Appendix C details the estimated counts determined for each country based on our analysis.

The estimate of entirely publicly funded Montessori schools, 9%, is based on supplemental data described in the Methods section along with responses to the survey of national Montessori organizations. Survey respondents also indicated an additional number of private schools receiving some form of government funding. Although the survey covers a limited number of countries and organizations, it provides a glimpse of the extent of government support of Montessori schools around the world.

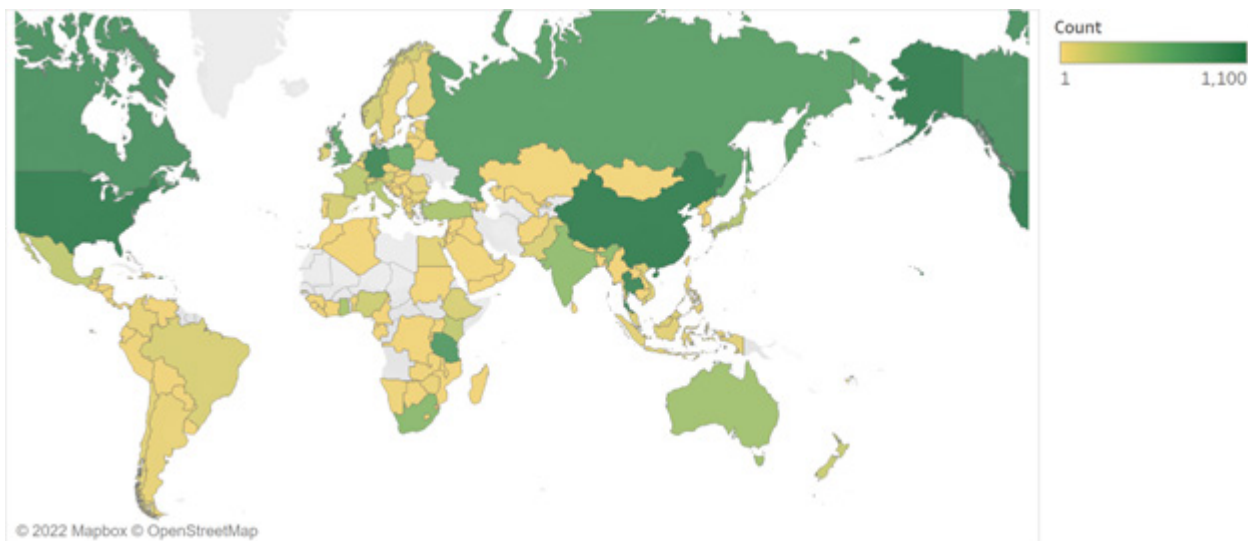
### Survey of Montessori National and Regional Organizations

Although not comprehensive, the 81 national and regional Montessori organization survey responses from 59 countries provide more insight than a simple count of schools, so here we present the survey results related to the structure of these Montessori organizations and the availability of teacher education programs in their respective countries.

Organizations report offering a variety of ways that schools connect with them, with almost half (44.9%) indicating that they offer different tiers of connection. Six in ten organizations reported allowing some level of connection that is open to any school (61.0%). Meeting specific criteria with verification was reported by less than half of organizations (40.3%), with only one-quarter

**Figure 1**

*Estimated Counts of Montessori Schools by Country*



*Note.* Scale ranges from yellow for the lowest numbers to dark green for the highest numbers (1,100+). Gray represents countries where no data exists. An interactive map is available at <https://public.tableau.com/views/GlobalMontessoriCensus2022/MontessoriCensusMap>.

allowing schools to sign up by paying a membership fee (27.3%). A much smaller proportion (13.0%) indicated that they offer a membership level with specific criteria but without verification. Much can be learned about how national and regional Montessori organizations around the world define the options they extend for schools to become members. These levels of membership are often connected to the definitions of Montessori education on which the respective organizations rely and is the topic of the next section.

We also asked national and regional Montessori organizations about any connected Montessori teacher education programs, and two-thirds reported having such programs (65.3%). The largest number of these organizations reported that the training centers were affiliated with AMI (61.1%); however, less than half reported that their training programs were independent (40.3%). No other training entities were mentioned by more than 20% of participants.

### **Synthesis of Current Definitions of Montessori Education**

Our data-gathering efforts provide an opportunity to shed light on the similarities and differences in how Montessori education is defined in various geographic locations. In our sample of 14 national Montessori organization websites and through data from survey respondents, we found that although many national member organizations have an orientation toward being

inclusive and welcoming, some national organizations are also in the process of developing quality criteria that would designate tiers of recognition of Montessori practice. Details of national-level definitions of what constitutes a Montessori school ranged widely across countries but repeatedly included a focus on the specifics of Montessori classroom practice and an emphasis on the broader philosophical orientation of the classroom. In some cases, national definitions leaned more toward Montessori practice, whereas others placed more emphasis on Montessori philosophy and, in some cases, both were included (e.g., Montessori Deutschland, Montessori Aotearoa New Zealand).

Despite these variations, we found overall consistency across country definitions in the following categories for focusing on these six ideas and practices as central pillars of Montessori implementation:

- Supporting Montessori philosophy
- Mixed-age groupings
- Montessori-trained teachers
- Montessori materials
- Freedom of choice
- Uninterrupted work block

These consistent definitions suggest that a common agreement occurs across numerous Montessori organizations regarding these broad pedagogical practices required of Montessori schools.

As we mentioned in our analysis of Montessori

**Table 2***To What Extent Do the Characteristics of Montessori Education Apply to the Schools Connected With Your Organization in Your Primary Country?*

	Never				Always
Mixed age grouping	1.33	5.33	10.67	21.33	61.33
Children use Montessori materials	1.35	2.70	10.81	25.68	59.46
Children have freedom of choice	1.35	6.76	12.16	28.38	51.35
Montessori-trained teachers	1.35	5.41	24.32	20.27	48.65
Uninterrupted work cycle	1.35	14.86	25.68	16.22	41.89

Note. *N* = 74–75; percentage reporting.

definitions from national and regional Montessori organizations, the survey asked participants about the degree to which schools in their country follow Montessori philosophy and engage in the five key practices previously identified (Table 2). Results suggest that the most consistently implemented practice is mixed-age groupings, followed by children using the materials. Roughly half of organizations report that schools connected to their organizations “always” have freedom of choice and Montessori-trained teachers. The least consistent characteristic was offering an uninterrupted work cycle.

Having outlined the results from the various sources of data, we conclude with a discussion of the implications of this work, limitations of the data collected, and directions for future research.

## Discussion

This study provides a frame of reference for those wanting to gauge the spread of Montessori education around the globe, with an estimate of 15,763 schools as of 2022. This estimate further supports claims that Montessori education represents the largest global alternative educational approach when compared with estimates of the numbers of schools implementing other approaches such as IB (3,600), Waldorf (1,857), and Reggio Emilia–inspired schools (1,200 members of the North American Reggio Alliance).

We have gathered survey data and consulted a range of additional data sources; however, this 2022 Global Montessori Census clearly has limitations. The survey was English language–based and relied on national organization websites, potentially ignoring grassroots schools using local languages. Initially, the survey was sent by AMI, an organization that has wide international reach, but it represents one part of the Montessori community. In addition, national and regional Montessori organizations can be unstable, with possible shifts in leadership and degree of representativeness over time. Ideally, future iterations of this project will include lists

of schools and broader outreach rather than just school counts and will coordinate with volunteers using local languages. We were able to arrive at a rough estimate of 9% of global Montessori schools being fully government funded. Additional questions around government schools versus private schools with some public funding, along with a better assessment of access and equity through data on public funding and the demographics of students served, will be necessary to truly understand the degree to which Montessori education serves a socioeconomically diverse population of students.

Ultimately, the 2022 Global Montessori Census provides a valuable resource for families, educators, researchers, and policymakers to better understand Montessori education’s reach, growth trajectory, and global diversity. Currently, no such comprehensive accounting exists, which results in inaccurate estimates of the prevalence of Montessori schools or gaps in knowledge about Montessori education’s global presence. By creating an empirical source of Montessori school data worldwide, we are providing a stable reference that overcomes the fragmented organizational landscape that is further complicated by national boundaries.

This 2022 Global Montessori Census offers an empirically based estimate of the prevalence of Montessori schools around the world. Given the diffusion and diversity of Montessori education globally, accurate and consistent accounting is challenging, but necessary, to understand the reach, growth trends, and diverse populations of students served in Montessori schools. Using data collected from international, national, and regional Montessori organizations, we estimate in the 2022 Global Montessori Census a total of 15,763 Montessori schools worldwide, with roughly 9% of them being government funded. We also documented similarities and differences in how national and regional Montessori organizations define Montessori education in their countries, which provides a basis for future, more granular accounting of schools. We acknowledge that although this estimate is based on multiple data sources, outreach to additional sources in the future could

increase the rigor of the count obtained, particularly with respect to government-funded and public Montessori schools. Furthermore, the definition of what constitutes a Montessori school in each country needs to be more fully examined. Although much remains to be learned about Montessori education worldwide, this project represents a valuable and stable resource for the field.

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**Appendix A**  
**Selected Questions From the Global Montessori Survey**

- What is the name of your national/regional Montessori organization?
- What country does your organization cover?
- How can schools connect with your Montessori organization? (Select all that apply.)
- Do you have different levels/tiers for schools connected to your organization based on Montessori implementation?
  - What is the estimate of the total number of Montessori schools in your organization's primary country, regardless of whether they are currently members of your organization? (Please use the broadest definition for what you consider to be Montessori schools.)
  - How many Montessori schools in your primary country are government funded?
  - How many Montessori teacher training centers are available in your primary country?
  - Which of the following affiliations do the training centers in your primary country have? (Select all that apply.)
  - To what extent do the following characteristics of Montessori education apply to the schools connected with your organization in your primary country?
    - Mixed age grouping
    - Montessori-trained teachers
    - Children use Montessori materials
    - Children have freedom of choice
    - Uninterrupted work cycle
  - How, if at all, does your organization monitor the Montessori implementation in schools connected to your organization in your primary country? (Select all that apply.)

## **Appendix B**

### **Defining and Including Montessori Schools, Organizations Consulted**

American Montessori International-USA—Standards for AMI Montessori classrooms: <https://amiusa.org/schools/standards-for-ami-montessori-classrooms/>

American Montessori Society—5 core components of Montessori education: <https://amshq.org/About-Montessori/What-Is-Montessori/Core-Components-of-Montessori>

Indian Montessori Centre: <https://www.indianmontessoricentre.org/>

Indian Montessori Foundation—Montessori schools: <https://montessori-india.org/montessorischools/>

International Montessori Foundation—Six principles of Montessori education, as defined by Nancy McCormick Rambusch and John Stoops in 1992

Montessori Aotearoa New Zealand—Montessori Journey to Excellence (MJ2Ex) Te Ara Ki Hihuatanga: Essential elements: <http://www.montessori.org.nz/professionals/journey-excellence/>

Montessori Australia—Montessori quality: Authentic practice: <https://static1.squarespace.com/static/6072dc974fd9550c4c8b1891/t/612f061741e7f022ceb6c562/1630471741376/MQAPBrochure.pdf>

Montessori Deutschland—Quality framework document: <https://www.montessori-deutschland.de/assets/Dokumente/QR-V2.0.4-Grundlegendokument.pdf>

Montessori Europe—Connecting Montessorians in Europe and beyond: <https://www.montessori-europe.net/>

Montessori for Kenya—Montessori: <https://www.montessoriforkenya.org/about-montessori/>

Montessori Mexico: <https://www.montessorimx.com/>

Montessori Public Policy Initiative:—Montessori essentials: <https://montessoriadvocacy.org/wp-content/uploads/2019/07/MontessoriEssentials.pdf>

Organização Montessori do Brasil: <http://omb.org.br/>

South African Montessori Association: <https://samontessori.org.za/sama-fundamental-principles/>

**Appendix C**  
**School Counts by Country**

Country name	Total estimate	Country name	Total estimate
Afghanistan	1	Hungary	7
Albania	2	India	417
Algeria	4	Indonesia	65
American Samoa	2	Iraq	2
Antigua and Barbuda	1	Ireland	81
Argentina	40	Israel	1
Armenia	9	Italy	243
Aruba	4	Jamaica	1
Australia	345	Japan	260
Austria	106	Jordan	1
Azerbaijan	4	Kazakhstan	1
Bahamas	1	Kenya	200
Bahrain	5	Kosovo	2
Bangladesh	3	Kuwait	10
Barbados	3	Lao People's Democratic Republic	3
Belarus	3	Latvia	32
Belgium	8	Lebanon	10
Belize	1	Lesotho	1
Benin	6	Liberia	1
Bermuda	1	Lithuania	2
Bhutan	1	Luxembourg	18
Bolivia	9	Macau	1
Bosnia and Herzegovina	6	Macedonia	1
Botswana	1	Madagascar	2
Brazil	110	Malawi	13
Brunei Darussalam	1	Malaysia	80
Bulgaria	40	Martinique	1
Burundi	1	Mexico	200
Cambodia	7	Mongolia	4
Cameroon	1	Morocco	1
Canada	900	Mozambique	2
Cayman Islands	5	Myanmar	4
Chile	60	Namibia	16
China	1,100	Nepal	19
Colombia	40	Netherlands	223
Costa Rica	46	New Zealand	169
Cote d'Ivoire	1	Nicaragua	7
Croatia	6	Nigeria	150
Cyprus	8	North Korea	1
Czech Republic	34	Norway	130
Democratic Republic of the Congo	3	Oman	1
Denmark	3	Pakistan	100
Dominica	1	Palau	1
Dominican Republic	16	Panama	7
Ecuador	6	Paraguay	6
Egypt	60	Peru	17
El Salvador	4	Philippines	45
Equatorial Guinea	1	Poland	600
Estonia	12	Portugal	20
Ethiopia	110	Qatar	3
Fiji	1	Romania	50
Finland	34	Russian Federation	750
France	225	Rwanda	2
Gabon	1	Saint Kitts and Nevis	3
The Gambia	13	Saint Lucia	3
Germany	1,000	Saudi Arabia	6
Ghana	300	Serbia	3
Greece	50	Seychelles	2
Grenada	1	Sierra Leone	1
Guam	1	Singapore	63
Guatemala	13	Slovakia	2
Guinea	1	Slovenia	35
Haiti	50	South Africa	450
Honduras	10	South Korea	15
Hong Kong (S.A.R.)	7	Spain	120

Country name	Total estimate
Sri Lanka	5
Sudan	1
Swaziland	2
Sweden	35
Switzerland	120
Syrian Arab Republic	1
Taiwan	60
Tanzania, United Republic of	800
Thailand	1,000
Trinidad and Tobago	2
Tunisia	1
Turkey	300
Uganda	10
United Arab Emirates	30
United Kingdom of Great Britain and Northern Ireland	700
United States of America	3,025
Uruguay	4
Uzbekistan	1
Venezuela, Bolivarian Republic of	3
Viet Nam	80
Virgin Islands (British)	1
Yemen	1
Zambia	15
Zimbabwe	30
<b>Total</b>	<b>15,763</b>



# Children With Disabilities Attending Montessori Programs in the United States

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*Keywords:* disabilities, Montessori programs, young children

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**Abstract:** Early childhood education plays a critical role in establishing positive social-emotional behaviors and promoting the development of skills needed to succeed in elementary school. Although inclusion of children with disabilities (CWD) in early childhood classrooms is increasing throughout the world, numerous social, logistical, and political factors continue to present challenges to full inclusion. The Montessori educational approach, established at the beginning of the 20th century and now applied widely throughout Europe and the United States, may present a highly suitable learning context for CWD, particularly given its historical basis in efforts to meet the needs of underprivileged and cognitively delayed children. On a theoretical level, the inclusion of CWD should be an accepted practice for Montessori programs, yet reports of the number and characteristics of CWD attending Montessori programs are scarce. This paper reports upon the findings of a survey of the current enrollment of CWD in U.S. Montessori Early Childhood programs. The survey indicated that CWD represent 3.75% of the Infant and Toddler (0–3 years) population and 8.49% of the Early Childhood (3–6 years) population at responding institutions. Additionally, although school directors indicated that their teachers generally feel confident and competent including CWD in their classrooms, they expressed a need for ongoing professional development and additional support from special education experts to further strengthen the inclusion of CWD in all aspects of Montessori education.

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More than 100 years have passed since Maria Montessori developed her namesake pedagogical Method, now implemented in thousands of schools across the world. According to the American Montessori Society as cited by Hiles (2018), there are approximately 20,000 Montessori schools globally. However, no reliable estimates exist of the number of children with disabilities (CWD) enrolled in these schools. This is surprising

considering the origins of the Method in Montessori's work with children facing social, economic, and cognitive disadvantages (McKenzie & Zascavage, 2012).

Montessori used her own observations to develop a teaching Method incorporating five components that she considered essential to build a strong developmental foundation for all children while also providing individually tailored programs (American Montessori

Society, n.d.). Many aspects of these core components are aligned with what are considered best practices for teaching CWD (Table 1).

In 2014, the Division of Early Childhood of the Council for Exceptional Children developed a set of recommended practices for supporting the development of CWD. These best practices include the use of teaching strategies tailored to the needs and interests of each child, systematic and phased instruction, and embedding opportunities for learning within relevant and naturally

occurring contexts; these practices are well served by the Montessori approach. Additional recommended practices—including freedom of movement for students, peer-mediated instruction, and opportunities for social-emotional development—are also reflected in core aspects of the Montessori Method. Further evidence of this alignment is provided in Table 1, which maps core components of Montessori pedagogy to specific recommended practices and expands upon the evidence-based benefits for CWD.

**Table 1**

*Core Components of the Montessori Method Matched to Practices Recommended by Division for Early Childhood*

Feature of core component	Benefit to children with disabilities (CWD)	Summary of practices for young children with disabilities recommended by Division for Early Childhood (DEC)
<b>Trained Montessori teachers</b>		
Teachers observe each child and guide them toward activities tailored to support their individual needs, interests, and developmental stage.	Responsive teaching and differentiated instruction are core tenets of numerous prevailing models of early intervention for CWD (DEC, 2014; Long, 2019; McWilliam, 2016; Strogilos, 2018).	Instruction 1: Identify strengths, preferences, and interests of child Instruction 12: Use and adapt specific strategies that are effective for their needs. Interactions 3, 4, 5: Promote communication, cognition, and problem-solving by observing, interpreting, and responding intentionally and contingently.
Teachers as facilitators of self- and peer-based learning	Child-directed learning strategies are key components of numerous models of effective early intervention and feature in multiple DEC-recommended practices for early childhood special education (Division for Early Childhood, 2014; Sigafoos et al., 2006; Wehmeyer & Palmer, 2000).	Environment 1: Provide services within naturally occurring learning opportunities. Instructions 4, 7, 10, 13: Plan and provide level of support, feedback, consequences, adaptation, modifications needed for access to and participation in learning within and across activities. Implement frequency, intensity, and duration of instruction needed to address the phase and pace of learning of each child. Use coaching and consultation to facilitate learning.
<b>The multiage classroom</b>		
Peer-to-peer instruction	The social and educational benefits of peer-based instruction for both CWD and their peers are considered an evidence-based practice (Garcia-Carrion et al., 2018; Carter et al., 2017; Chang & Locke, 2016; Watkins et al., 2015; Gunning et al., 2019; McLeskey et al., 2017; Steinbrenner et al., 2020).	Environment 1: Provide services within naturally occurring learning opportunities. Instruction 8: Use peer-mediated intervention to teach skills and to promote child engagement and learning.

Feature of core component	Benefit to children with disabilities (CWD)	Summary of practices for young children with disabilities recommended by Division for Early Childhood (DEC)
Integrated opportunities for social skills development	Consistent, natural opportunities for young children with disabilities to observe appropriate social behaviors and to practice them in a natural environment has been shown to improve the social skills of children with a variety of disabilities or developmental delays as well as children without disabilities (Gupta & Henninger, 2014; Law et al., 2017).	Instruction 13: Facilitate positive adult-child interactions and instruction. Interactions 1, 2: Promote social-emotional development by responding contingently to the range of emotional expressions and creating opportunities for child-initiated positive interactions during naturally occurring activities.
<b>Using Montessori materials</b>		
Hands-on learning with tangible materials (“concrete to abstract” approach)	Activity-based instruction that includes hands-on activities is considered a key practice for CWD, such as attention-deficit/hyperactivity disorder (ADHD; Gkeka et al., 2018), auditory processing disorders (McKenzie et al., 2011), language delays (Springle, 2020), and specific learning disabilities (Alenizi, 2019; Jamieson, 2005).	Instruction 1: Identify child’s strengths, preferences, and interests. Instruction 5: Embed instruction within and across routines, activities, and environment, providing contextually relevant learning opportunities. Instruction 10: Implement frequency, intensity, and duration of instruction to address child’s phase and pace of learning.
Each material is designed to teach one specific concept.	The Council for Exceptional Children consistently recommends the use of targeted instruction and materials to support the learning of children with intellectual disabilities (McLeskey et al., 2017).	Instruction 2: Identify skills to target for instruction. Instruction 5: Embed instruction within and across routines, activities, and environment, providing contextually relevant learning opportunities. Instruction 6: Use systematic instructional strategies to teach specific skills. Instruction 7: Use explicit feedback and consequences to increase engagement, play, skills.
Autocorrective materials	Teaching strategies that emphasize immediate correction have long been known to improve the learning outcomes of children with intellectual and learning disabilities, as well as facilitate independence, engagement, and success (Hughes & Agran, 1993; Ibrahim, 2018; Kosiewicz et al., 1982).	Instruction 5: Embed instruction within and across routines, activities, and environment, providing contextually relevant learning opportunities. Instruction 7: Use explicit feedback and consequences to increase engagement, play, skills. Instruction 13: Use coaching and consultation to facilitate positive interactions and instruction designed to promote learning.
Sensory materials	Materials that facilitate the use of a variety of senses have proven effective in teaching children with a variety of disabilities, most notably intellectual disabilities (Güldenpfennig et al., 2019; Jadan-Guerrero et al., 2015; Purpura et al., 2017).	Environment 3: Modify and adapt physical, social, and temporal environments to promote child’s access to and participation in learning experiences.



Feature of core component	Benefit to children with disabilities (CWD)	Summary of practices for young children with disabilities recommended by Division for Early Childhood (DEC)
<b>Child-directed work</b>		
Children self-select activities according to their individual needs and interests.	Young children learn best when they are actively interested in and engaged with the target material (Murawski & Scott, 2019). Interest-based learning is a key aspect of both differentiated instruction and responsive teaching (DEC, 2014; Long, 2019; McWilliam, 2016; Strogilos, 2018).	Environment 2: Identify skills to target for instruction. Environment 3: Modify and adapt physical, social, and temporal environments to promote child's access to and participation in learning experiences. Instruction 1: Identify child's strengths, preferences, and interests. Instruction 2: Identify skills to target for instruction based on interests.
Freedom of movement around the classroom	Including opportunities for movement in the classroom is a DEC-recommended practice for special education (DEC, 2014) and has shown particular benefit for young children with ADHD (Akkerman, 2014; Gkeka et al., 2018).	Environment 6: Create environments that provide opportunities for movement and regular physical activity.
Work cycles: Children are taught to direct themselves through a complete process of selecting activity → engaging in activity for as long as desired → completing activity → cleaning up and returning materials.	Past research has cited the importance of developing executive function to promote adaptive behaviors and academic achievement in children with a diverse variety of disabilities including ADHD, autism, and intellectual disabilities (Bertollo & Yerys, 2019; Di Lieto et al., 2020; Gkeka et al., 2018; Kirk et al., 2015; Will et al., 2016).	Environment 1: Identify child's strengths, preferences, and interests across activities, routines, and domains. Environment 6: Create environments that provide opportunities for movement and regular physical activity. Instruction 2: Identify skills to target for instruction based on interests. Instruction 4: Plan and provide level of support, feedback, consequences, adaptation, and modifications needed for access to and participation in learning within and across activities. Instruction 5: Embed instruction within and across routines, activities, and environment, providing contextually relevant learning opportunities.
<b>Uninterrupted work periods</b>		
Self-paced learning	The understanding that each child progresses through developmental milestones at his or her own pace is a key component of early-intervention best practices for CWD and is a DEC-recommended practice for teaching children with disabilities (DEC, 2014; Spittle & Morgan, 2018).	Instruction 5: Embed instruction within and across routines, activities, and environment, providing contextually relevant learning opportunities. Instruction 7: Use explicit feedback and consequences to increase engagement, play, skills. Instruction 10: Implement frequency, intensity, and duration of instruction to address child's phase and pace of learning.

Feature of core component	Benefit to children with disabilities (CWD)	Summary of practices for young children with disabilities recommended by Division for Early Childhood (DEC)
Unlimited opportunities for repetition	Sufficient opportunities for repetition and practice is critical for development and generalization of skills (Spittle & Morgan, 2018).	Instruction 2: Identify skills to target for instruction based on interests. Instruction 5: Embed instruction within and across routines, activities, and environment, providing contextually relevant learning opportunities. Instruction 7: Use explicit feedback and consequences to increase engagement, play, skill.

Research indicates that children educated in Montessori schools outperform peers from traditional schools in terms of academic outcomes, creativity, social skills, and self-reported well-being by kindergarten age (Denervaud et al., 2019; Lillard et al., 2017; Marshall, 2017). Studies also have reported higher executive function in children who received a Montessori education (Culclasure et al., 2018; Kayılı, 2018; Lillard, 2012; Lillard et al., 2017; Phillips-Silver & Daza, 2018). Similar benefits were reported in children who attended traditional schools but who used Montessori materials outside of the classroom (Dogru, 2015). The intersection of best practices in serving CWD with the key components of the Montessori Method (Table 1), coupled with the benefits of Montessori education for all children, strongly suggests that CWD can and should be included in Montessori programs.

### Montessori Method and Inclusion

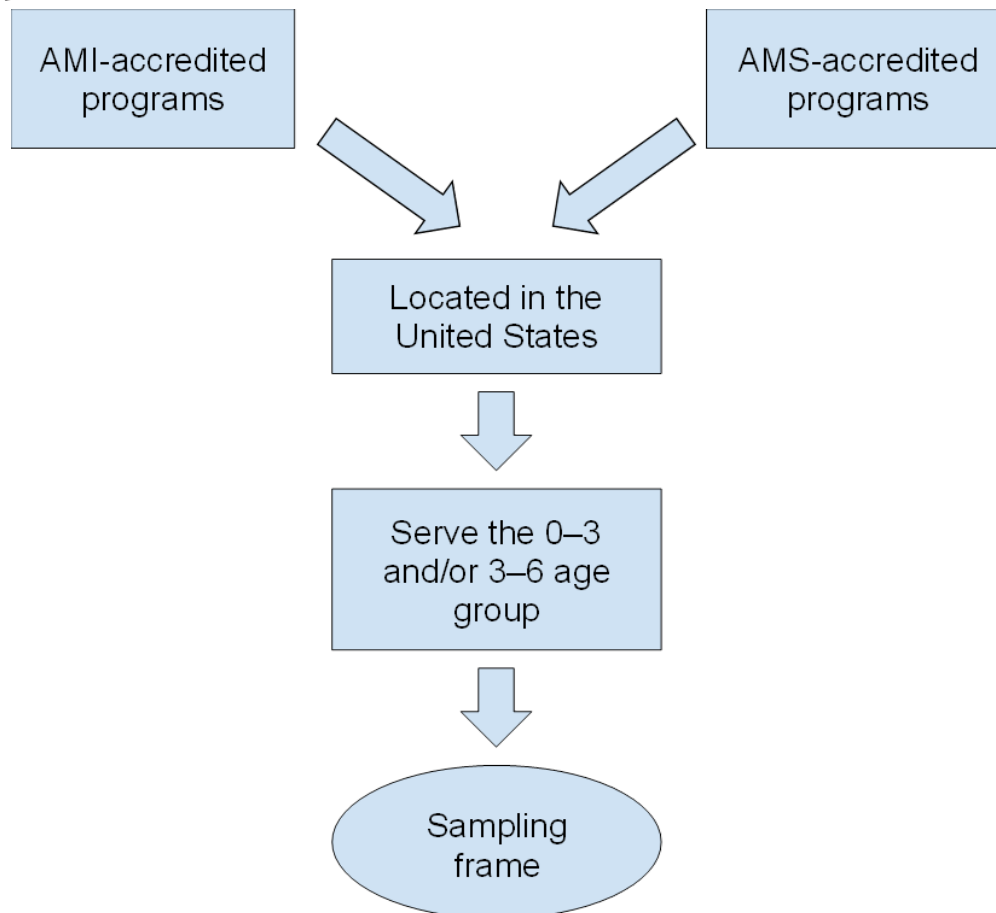
*Inclusion* is built upon the philosophy that all children can and should learn in communal classrooms, where they are provided with differentiated instruction according to individual needs, learning styles, and abilities. The central goal is to ensure children of all abilities participate in school activities together by offering meaningful and varied opportunities to access the general curriculum (Kolbe, 2019; Long, 2019; O'Connor et al., 2016). Although inclusion is the current educational paradigm, implementing it in all classrooms continues to be challenging (Jones & Peterson-Ahmad, 2017; O'Connor et al., 2016). However, given their emphasis on individualized instruction, child-directed learning with self-corrective materials, and teachers acting as motivators and facilitators of learning rather than didactic instructors of specific skills, Montessori

classrooms may provide the ideal environment in which to implement inclusion (Danner & Fowler, 2015; Leigh-Doyle et al., 2008).

Teachers' attitudes toward disability can affect their capacity to successfully include CWD in the classroom. Twenty-five years ago, Epstein (1997, 1998) reported that even when Montessori teachers expressed commitment to including CWD in their classrooms, limitations in their knowledge of strategies to support children exhibiting challenging behaviors led them to question their capacity to include CWD in Montessori classrooms. Epstein recommended providing teachers with additional training in behavior management, partnering with families, and collaborating with special education personnel to promote teachers' skill development, competence, and confidence. Almost 20 years after Epstein first discussed the need for continuing professional development, Danner and Fowler (2015) found that Montessori teachers continued to be less knowledgeable about CWD and had fewer special education professional-development opportunities than their non-Montessori counterparts did, even though both groups reported the presence of similar and positive system-wide supports for inclusion within their schools. More recently, AuCoin and Berger (2021) again emphasized the need for systemic enablers and practical training to support Montessori teachers and non-Montessori special educators in collaborating to support students with disabilities.

Moreover, although both theory and research indicate the Montessori Method may be a valuable option for CWD (AuCoin & Berger, 2021), little information is available at this time regarding the number of students with disabilities in the United States who currently benefit from this methodology. Here, we seek to fill this gap by reporting the findings of a cross-sectional survey

**Figure 1**  
*Sample Development Process*



with three main objectives: (a) to determine the extent to which CWD are included in accredited U.S. Montessori programs, (b) to describe the types of disabilities represented, and (c) to elucidate the characteristics and needs of the institutions and teachers serving these children.

## Methods

### Study Population

The target population for the survey consisted of nationally or internationally accredited Montessori programs in the United States. To promote validity of the results and to ensure each school was represented only once within the sample, the survey was sent to school directors, who served as representatives for their respective institutions. Only accredited institutions were included within the target population to ensure the

responding programs offered a true representation of Montessori principles, methods, and values.

We used the membership lists of the American Montessori Society (AMS) and Association Montessori Internationale (AMI) to develop a list of accredited Montessori programs in the United States serving the infant and toddler (aged 0-3) and/or early childhood (aged 3-6) populations. Both these internationally respected organizations have taken a leading role in registration and quality control of Montessori programs. In all, the survey was sent to 355 school directors, 80 of whom completed it in full, yielding a response rate of 22.54%. Figure 1 summarizes the inclusion criteria and sample-selection process.

### Survey Instrument

The full survey consisted of one open-ended question and five sections composed of 31 close-ended questions.

1. Respondent demographics
2. Student characteristics (all students and students with disabilities)
3. Teacher and faculty characteristics
4. School facilities and services
5. School departure (if applicable)

We estimated the survey would require 10 to 15 minutes to complete.

In this analysis, we report responses from the first four sections. Although we collected general demographic data, we requested no personal identifiers, and all questions were optional.

We collected data on both the number of students with a documented, diagnosed disability and the number of students with an Individualized Family Service Plan (IFSP) or Individualized Education Plan (IEP). The survey included a list of common types of disability (physical disability, intellectual disability, sensory disability, etc.), and respondents were asked to report the number of students with each type. For broader categories, such as physical disability, we provided specific examples of conditions but told respondents that the list was not exhaustive. The survey included an option for multiple disabilities, and participants could add conditions that they thought were omitted from the provided options. Sample questions from each analyzed section are in the Appendix.

### Dissemination Procedures

The survey was designed and distributed using Qualtrics, an online software for web-based data collection. Eligible participants received an email with the link to complete the survey. To maximize response rates, two email reminders were sent at the end of the first and second weeks. As the COVID-19 pandemic exploded and schools were shut down, an additional reminder was sent, and the time for completion was extended. We sent a total of three reminders, and the survey remained open from April 30, 2020, to June 10, 2020.

### Ethical Approval

The study was approved by the Georgetown University Institutional Review Board (STUDY00002262). A consent form was sent to participants at the outset of the survey that stated that participation was voluntary and the confidentiality of individual responses would be maintained.

## Results

### Respondents and Schools Represented

Eighty school directors responded to the survey, yielding a response rate of 22.5%. Demographic characteristics are in Table 2. Most respondents were White (83.33%), female (93.75%), and over the age of 39 (86.25%).

Approximately 60% of the respondents had more than 10 years of experience teaching in Montessori schools, 21% had six to 10 years of experience, and roughly 19% had taught in Montessori settings for five or fewer years.

The responding directors represented 80 U.S. Montessori schools serving children from birth through 6 years of age. Most schools (67.09%) served 76–100 students, 15.19% served 51–75 students, and 12.66% enrolled 26–50 students. Four other schools (5.06%) reported enrollments of fewer than 25 students.

In aggregate, 1,893 infants and toddlers (aged 0–3) and 4,655 early childhood or primary-aged students (aged 3–6) were enrolled at the responding schools<sup>1</sup>; there were 157 teachers and administrators. Most schools (51.25%) employed more than 13 teachers, 40% employed 3–12 teachers, and 8.75% employed only two teachers. The survey did not ask whether the schools were public or private programs.

### Number and Characteristics of Students With Disabilities

Some respondents did not include the number of CWD in their schools, so we used a subgroup of respondents who did provide exact counts of CWD ( $n = 77$ ) to determine the prevalence of CWD in each age group. The data from these 77 respondents identified 71 CWD aged 0–3, or 3.75% of the total infant–toddler population of the schools surveyed. Three hundred ninety-five CWD aged 3–6 (i.e., 8.49% of the total population of surveyed schools) were enrolled in the programs from which we received survey responses.

Results indicate representation of children with a wide range of disabilities. In the infant and toddler programs (aged 0–3), the most common type of disability was speech and language delay and the least common

<sup>1</sup> Three of the 80 schools provided estimates, not exact counts, of the number of children and/or number of children with disabilities enrolled. Seventy-seven schools reported exact counts.

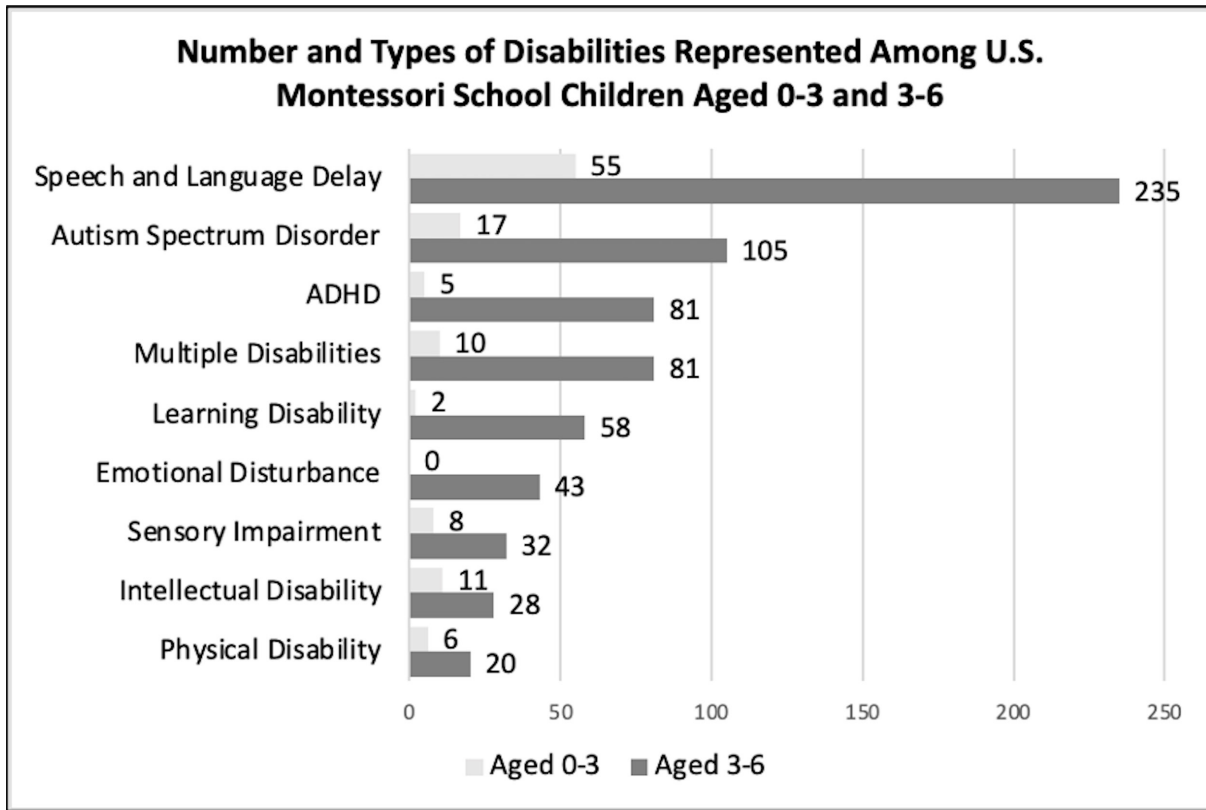
**Table 2**  
*Demographic Characteristics of Respondents (N= 80)*

Characteristic	Number (%)
Gender	
Female	75 (93.75)
Male	5 (6.25)
Race <sup>a</sup>	
White	70 (83.30)
Hispanic/Latinx	5 (5.95)
Black	4 (4.76)
Asian	4 (4.76)
Other	1 (1.19)
Age	
30–39	11 (13.75)
40–49	24 (30.00)
≥ 50	45 (56.25)
Education <sup>b</sup>	
Bachelor’s degree	24 (23.50)
Master’s degree	52 (51.49)
Doctoral degree	6 (5.94)
Job category	
School director	47 (58.75)
Montessori guide	9 (11.25)
Montessori Early Childhood educator	2 (2.50)
Manager or supervisor	7 (8.75)
Other (consultant, coach, director of learning support program)	15 (18.75)
Certification of respondent	
None	8 (10.13)
American Montessori Society (AMS)	32 (40.51)
Association Montessori Internationale (AMI)	28 (35.44)
Other	11 (13.92)
Experience teaching in Montessori schools	
< 5 years	15 (19.00)
6–10 years	17 (21.52)
11–15 years	10 (12.66)
> 16 years	37 (46.84)

*Note.* Totals may not sum to 80 because of selective nonresponse. <sup>a</sup> Respondents could select multiple options.

<sup>b</sup> Some respondents indicated all degrees received.

**Figure 2**  
*Disabilities in Children Enrolled in U.S. Montessori Programs*



type was emotional disturbance. In the preschool age group (aged 3–6), speech and language delay remained the most common category, while physical disability was the least common (Figure 2). In the Other category, one school reported a student with Tourette syndrome, and another school reported a student with albinism.

In addition to asking which disability the children were diagnosed with, we asked how many children had an IFSP or IEP. The respondents indicated that 70 infants and toddlers had an IFSP, and 257 students aged 3–6 had an IEP. These findings suggest that 98.60% of students with diagnosed disabilities aged 0–3 have an IFSP, while 65.00% of the students with diagnosed disabilities aged 3–6 have an IEP.

### **Institutional Supports for Students With Disabilities**

Among the 80 schools that participated in the survey, 75% reported complying with the Americans with Disabilities Act (ADA), while 6.25% did not. The remaining 18.75% of respondents indicated that the ADA-compliance status of their school was unknown. Over 83% of the respondents reported that all indoor and outdoor areas were accessible and easy to reach by all children. Almost 13% of the schools reported that

some areas were not accessible for children with physical disabilities, as certain areas could not accommodate wheelchairs or students with vision or hearing impairments.

Most respondents also indicated that their schools had specialists available to provide in-school services to children who needed them (Table 3). The vast majority of the surveyed schools (94%) collaborated with local communities to ensure that all students received the services for which they were eligible or that they needed

**Table 3**  
*Services Available at Montessori Schools in the United States (N = 80)*

Service	Number of schools (%)
Special education	43 (20.67)
Psychology	29 (13.94)
Speech-language pathology	56 (29.92)
Physical therapy	19 (16.83)
Occupational therapy	35 (16.83)
Behavior support	26 (12.50)

to be successful. Twenty-two percent of the schools also offered specialized home-based services such as speech therapy, occupational therapy, emotional support, and counseling.

To better understand the extent to which the teachers in the surveyed Montessori programs were prepared to work with CWD, we asked participants to indicate the number of teachers at their institution who had received specific training to work with students with disabilities (Table 4). Of the 80 programs, 56 programs reported having teachers with specific training in teaching CWD;

**Table 4**  
Number of Teachers Trained for Teaching Children With Disabilities at Surveyed Schools (N = 80)

Number of teachers with specific training in teaching children with disabilities	Number of schools (%)
0	24 (30)
1	12 (15)
2–4	23 (28.75)
5–8	14 (17.50)
More than 8	7 (8.75)

however, 24 schools reported no teachers had received specialized training.

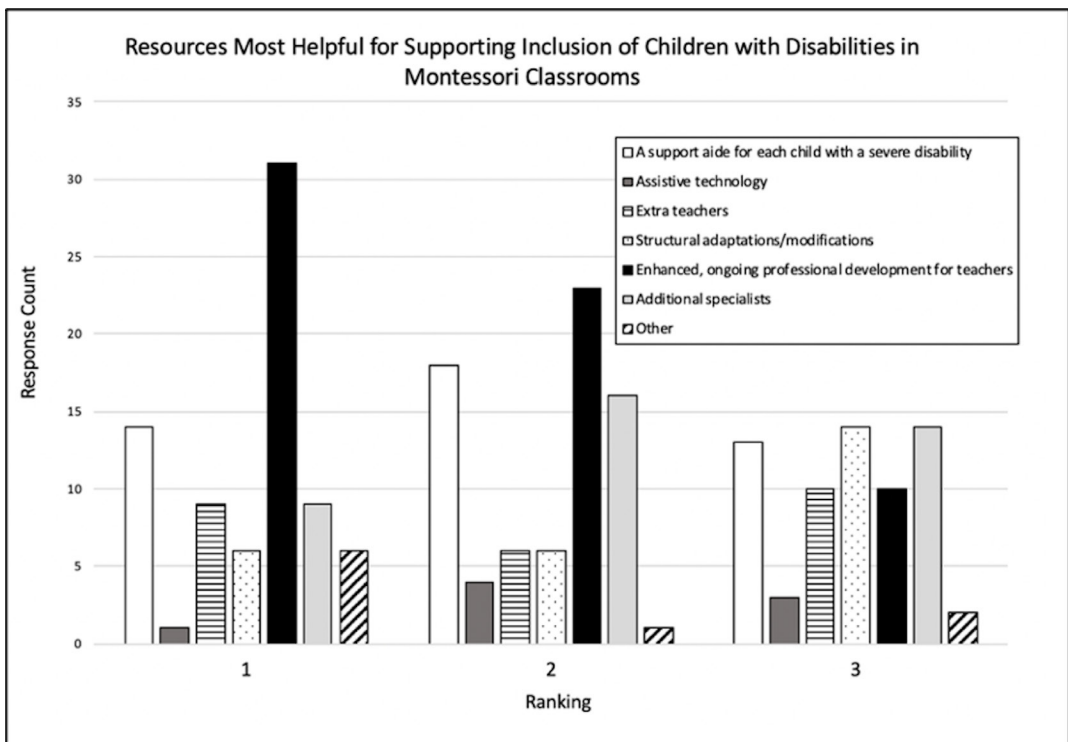
The survey also asked respondents (i.e., school directors) to estimate the confidence their faculty felt when trying to successfully include CWD in their classrooms. Most respondents (86.07%) perceived that most teachers and staff at their institutions felt at least somewhat confident working with CWD (44.30% = *confident*, 41.77% = *somewhat confident*). However, 13.92% reported they did not perceive their teachers to feel confident working with CWD.

### Additional Resources

The survey provided participants a list of potential resources to help support CWD in Montessori classrooms and asked participants to rank the options in order of their perceived utility. Respondents also could add other resources they believed would help promote inclusion in their programs. Figure 3 shows the resources most commonly receiving a first-, second-, or third-place ranking.

Overall, respondents most preferred “enhanced, ongoing professional development” as a resource; this resource ranked first in 40.8% of cases and ranked in the top three for 84.2% of respondents. Other popular

**Figure 3**  
Most Helpful Resources for Supporting Inclusion of Children With Disabilities in Montessori Classrooms



selections included “a support aide for each child with a severe disability”—which 59.2% of respondents ranked in the top three resources—and “additional specialists,” ranked in the top three by 51.3% of respondents. Excluding the Other category, “assistive technology” was deemed the lowest priority of the services listed, ranking within the top three in just 10.5% of cases and ranking sixth or seventh by half of the 62 respondents who ranked all options.

As stated, respondents were invited to identify other resources they believed helpful for supporting the inclusion of CWD. “Additional funding” was the most frequently cited request; “social workers,” “informational resources for families,” “time for individualized programming / planning,” and “special education providers specifically trained in the Montessori Method” were also mentioned. Other suggestions included “special education consulting / coaching,” “more classroom or break space,” and “an elevator.”

## Discussion

Contemporary philosophies of early childhood education advocate for the development of universally designed programs that provide support to a diverse student body, including young children with disabilities. Although there is limited research on inclusion in the Montessori context specifically (Danner & Fowler, 2015), the historical context of the approach and the key principles of a Montessori education make a compelling case for the participation of CWD in these programs.

Indeed, a Montessori setting may provide an educational environment that is especially conducive to including CWD. The philosophy of Montessori education is to follow the child and individualize the curriculum to meet the needs of each child. Moreover, the multiage classroom format—designed to facilitate self-paced learning for and by each child—empowers children to move at their own pace from introductory activities through advanced materials and concepts. These tenets of Montessori education provide a good fit for students with disabilities (AuCoin & Berger, 2021; McKenzie & Zascavage, 2012; Pickering, 2008). However, despite the rich background connecting this approach to special education, the Montessori Method has not yet been emphasized as a program for serving CWD in the United States.

Montessori education is considered appropriate for all children—including CWD when supports are provided—by virtue of its design, pedagogy, materials,

and instructional methods (Nehring, 2014). The objective of a Montessori education is to support the optimal development of children by encouraging the natural developmental processes (Nehring, 2014). The objective of early childhood special education is also to support the development of young children, across domains, in a manner that builds upon the strengths of each child (Division of Early Childhood, 2014).

The results of this study indicate that the Early Childhood Montessori programs that responded to the survey enroll children with a wide variety of disabilities and offer individualized services and support. According to the study, 3.49% of infants and toddlers and 8.49% of preschoolers enrolled in the responding Montessori programs were identified as having a disability. These percentages are similar to the percentage of children aged 0–3 served by Part C of the Individuals with Disabilities Education Act (IDEA, 2004), but they are higher for the children served under the preschool component of IDEA. According to the most recent annual report to Congress on the Implementation of IDEA, 3.7% of infants and toddlers and 6.7% of preschoolers were served under IDEA during 2019 (U.S. Department of Education, 2022).

The survey respondents identified the number of children with specific disabilities and the number of children currently receiving services through an IFSP or IEP at their schools, although these counts did not align for every school. This discrepancy may be attributable to one or more of several causes. First, some children, such as those with attention-deficit/hyperactivity disorder, may not be eligible for an IFSP or IEP, despite being diagnosed with a disability. To be eligible for services delineated on an IFSP or IEP, students must meet specific, state-defined criteria that do not apply to all children with diagnosed disabilities. Alternatively, it is possible that some children diagnosed with a disability are not referred to the local education agency to determine eligibility for IDEA services and support. Further research may clarify whether this inaction occurs at families’ request or because staff in the Montessori program do not know the eligibility process for early-intervention or preschool services.

Aligning with previous research (AuCoin & Berger, 2021), the teachers in the current study expressed positive attitudes about inclusion. Moreover, results suggest that school directors perceived their teachers to be competent and confident when teaching CWD. This latter finding contrasts with previous studies, which indicated that Montessori teachers felt less prepared to



teach CWD than did non-Montessori teachers (Danner & Fowler, 2015). Given the increasing awareness of learning differences, sensory sensitivities, and other special education needs, Montessori programs now offer disability-related information to teachers, thus potentially helping increase teachers' competencies in this area (Chaffin, 2019; Montessori Institute of San Diego, n.d.).

Despite these improvements, the respondents to this survey acknowledged a need for additional training. Most school directors desired an enhanced, ongoing professional-development program to better prepare their faculty to work with CWD. Particularly given that nearly half of the responding institutions employed one or no teachers trained in special education or in working with CWD, more education on how to incorporate CWD into the Montessori curriculum could be of great benefit in ongoing inclusion efforts. School directors' desire reflects a broader gap extending beyond Montessori programs, as early childhood teachers across the nation report a need for ongoing professional development to include CWD in their classrooms, differentiate instruction, and meet individual needs (Yu & Park, 2020). The importance of collaboration among special educators and Montessori educators has been emphasized recently both by researchers (AuCoin & Berger, 2021) and by the Division of Early Childhood (2014), which has developed specific recommended practices to aid teachers in teaming and collaboration.

Survey respondents also requested more aides and specialists to work directly with CWD in their classrooms. Contemporary practices for supporting CWD, however, instead advocate including children in classrooms in which the primary classroom personnel (i.e., teachers) are provided with the materials, resources, and training to differentiate instruction for all children, regardless of their abilities (Gauvreau et al., 2021). Although specialists are needed to consult with teachers in designing differentiated lesson plans, the use of one-to-one aides should be limited to a very few students under exceptional circumstances (Giangreco, 2021).

A key principle in the Montessori Method is creating an enriched, child-oriented environment that promotes both student independence and cooperation. Space constraints are minimized to allow freedom of movement, a practice that encourages including children who have mobility concerns. At minimum, successful application of this principle requires an ADA-compliant environment. Although the present study found that most of the respondents reported ADA compliance, nearly 13% of responding institutions acknowledged that some areas of

their schools were not accessible to children with physical or sensory disabilities. Moreover, mere compliance with the ADA may not be adequate to fully include CWD in all aspects of the program. For example, Brown and colleagues (2021) found that a variety of playground features must be incorporated to ensure truly inclusive playgrounds. A few of the elements important for early childhood spaces include designing spaces that consider a variety of disabilities, including children who use mobility devices and accommodating for the presence of adults.

In summary, our survey results suggest that young children with disabilities are enrolled in the responding Montessori schools and that school directors perceive teachers to feel competent and confident in supporting these students. We identified opportunities to enhance teachers' ability to include all children equitably, most notably in the area of professional development.

### **Study Limitations**

A variety of limitations are related to this study. First, we surveyed only programs registered with AMS or AMI, limiting our sampling pool. We employed this strategy to provide a minimal level of confidence that the sample schools were recognized Montessori programs. Thus, while we believe our sample provides an adequate representation of the U.S. programs registered with these organizations, further research will be required to determine whether the trends hold true among all Montessori programs.

The disability categories in our survey may have been confusing for respondents; we did not provide operational definitions, and "developmental delay" was not listed as an option when we requested counts of children with specific diagnoses. Infants, toddlers, and preschoolers—especially those receiving early-intervention services—are often determined to have a developmental delay. Thus, the lack of this explicit option may have led school directors to not include in their counts some children with a diagnosis of developmental delay but no other specific disability. For future research, using the disability categories and definitions established under IDEA may promote additional clarity and consistency in the responses.

This research was designed and developed before the COVID-19 pandemic, but the survey was distributed during the lockdown period. Many schools received the survey but did not complete it, likely because of the pandemic and the other changing management and teaching activities resulting from the pandemic. Therefore, the study is limited not only by sample size but

also by the smaller-than-expected number of respondents. Thus, we cannot confidently project these findings nationally. Future studies should aim to replicate results on a larger scale.

Last, data analysis was performed on all surveys that were submitted, and all data were tabulated. However, because respondents were offered the option to skip questions that they preferred not to answer, data such as the number of children with various disabilities as well as the types of disabilities or services provided were missing in some cases.

## Conclusion

The results we analyzed indicate that, at least among responding programs, young children with disabilities are represented in the Montessori setting. The percentage of CWD reported here is similar to the number served by IDEA as reported by the annual report to Congress. Although many school directors perceived their staff as competent and confident when supporting children with varying developmental needs within their classrooms, they also reported that ongoing professional-development opportunities and additional classroom support would aid their teachers and programs in equitably including all children using contemporary practices. Joint professional-development opportunities featuring Montessori teachers, early childhood teachers, and special educators would be helpful to promote collaboration, share practices, and support integrated, inclusive classrooms. As AuCoin and Berger (2021) noted, collaboration between special educators and Montessori teachers is essential for successful inclusion of young children with disabilities in Montessori programs. Additional research on the specific services received and the specialized practices incorporated into Montessori classrooms would provide a comprehensive description of how Montessori programs effectively include CWD and how the Division for Early Childhood–recommended practices are implemented within the Montessori approach.

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## Appendix

### Selected Survey Items Used in the Analysis

Survey section	Sample items
Respondent demographics	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Years of experience working in schools</li> </ul>
Child characteristics	<ul style="list-style-type: none"> <li>• Total number of children enrolled in the 0–3 and 3–6 age groups</li> <li>• Number of children in each age group with a diagnosed disability</li> <li>• Number of children with an Individualized Family Service Plan or Individualized Education Plan</li> <li>• Number of children with               <ul style="list-style-type: none"> <li>○ Physical disability (e.g., cerebral palsy, spinal muscular atrophy, muscular dystrophies, congenital myopathies, movement disorders, etc.)</li> <li>○ Sensory impairment (e.g., Deafness or severe hearing impairment, blindness, severe visual impairment, etc.)</li> <li>○ Autism spectrum disorder</li> <li>○ Intellectual disability</li> <li>○ Speech and language delay or disability (e.g., processing, articulation difficulties, delay in language development, etc.)</li> <li>○ Learning disability</li> <li>○ Attention-deficit/hyperactivity disorder, or other health impairment</li> <li>○ Emotional disturbance</li> <li>○ Multiple disabilities</li> </ul> </li> </ul>
Teacher and faculty characteristics	<ul style="list-style-type: none"> <li>• Number of teachers who have received training in teaching children with disabilities</li> <li>• Number and types of specialists (e.g., special educators, psychologists, occupational therapists, etc.)</li> <li>• Proportion of teachers who feel confident working with children with disabilities</li> </ul>
School facilities and services	<ul style="list-style-type: none"> <li>• Americans with Disabilities Act (ADA) compliance status (if known)</li> <li>• Presence of specialized services (e.g., speech therapy, occupational therapy, counseling, etc.)</li> <li>• “What resources would your program find most helpful to include children with disabilities into your program?” [Ranked from 1 (<i>most important</i>) to 7 (<i>least important</i>)]</li> </ul>



# The Montessori Method and the Neurosequential Model in Education (NME): A comparative study

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**Keywords:** *Montessori Method, Neurosequential Model in Education (NME), sensitive periods in development, neuroscience and Montessori*

**Abstract:** The Neurosequential Model in Education (NME) is described as a developmentally sensitive and biologically respectful approach to development and learning. This paper postulates that the NME shares many commonalities with the Montessori Method in that it, too, is developmentally sensitive and adheres to biologically respectful concepts. This paper compares some of the core principles and recommended practices of the NME with those in the Montessori Method and argues that they are consistent in many ways. The paper also examines Dr. Montessori's unique use of "sensitive periods" in development for educational purposes, in particular her use of the sensitive periods for movement, the social aspects of life, and the sensitive period for order respectively. It argues that in doing this, she was actively promoting an approach to human development and education that appears to correlate with what Dr. Bruce Perry calls a developmentally sensitive and biologically respectful approach to learning. The goal of this study is to show the science behind why many of Dr. Montessori's original practices worked and had such a positive effect on children. This knowledge should empower Montessori educators and give them the confidence to promote authentic Montessori practices in the knowledge that they are in line with current neuroscientific theories that have been shown to be beneficial to children.

*Is Montessori a genius? Is her book a real contribution to educational thought? Has her method something in it vital and universal? (Stevens, 1912, p. 78)*

Maria Montessori (1870–1952) could well be described as a brain scientist ahead of her time. She became a medical doctor in 1896 and specialized in psychiatric conditions in children (Babini, 2000). She

then turned her attention to education and human development (Babini & Lama, 2000; De Stefano, 2022; Kramer, 1976; Standing, 1957). In the above quotation, the book Stevens refers to is Dr. Montessori's seminal publication, which has been known as "The Montessori Method" since it was first translated into English in 1912. However, when Dr. Montessori first published this book in Italian in 1909, she gave it the title, "*Il Metodo della*

*Pedagogia Scientifica applicato all'educazione infantile nelle Case dei Bambini,*" which means in English, "The Method of Scientific Pedagogy Applied to the Education of Young Children in the Children's Houses." Historically, "Scientific Pedagogy" was what the Montessori Method was all about.

The Neurosequential Model in Education (NME) was developed by and is based on the work of the neuroscientist and child psychiatrist Dr. Bruce Perry. The NME is a non-therapeutic adaption of the Neurosequential Model of Therapeutics (NMT), also developed by Perry. The NMT, which started out as a purely clinical approach related to Perry's work, is an approach that incorporates key principles of neurodevelopment into the clinical problem-solving process. Perry describes it as "developmentally sensitive, neurobiology-guided practice" (Perry, 2009, p. 248). The NME, on the other hand, is non-therapeutic. Perry describes it as "a developmentally sensitive and biologically respectful approach to learning" (ThinkTVPBS, 2020a). The NME has universal application across the entire spectrum of children but is especially beneficial to children with developmental problems. The NME is a "train the trainer" model in which teachers (often school principals) are trained in the NME and then pass that training on to other teachers in their school or district. The goal of the training is not to turn teachers into therapists, neuroscientists, or psychologists; rather, the training guides teachers in identifying the child's primary developmental problems and then aids them in developing a rehabilitative plan that helps to reduce difficult behaviors and increase the child's ability to engage successfully in developmentally appropriate educational activities.

This paper compares some of the core principles and recommended practices of the NME with those in the Montessori Method and outlines the shared features of the two models and shows how Dr. Montessori's early work anticipated many current principles in neuroscience. It also examines Dr. Montessori's unique use of "sensitive periods" in development for educational purposes (in particular, her use of the sensitive periods for movement, the social aspects of life, and order, respectively, and argues that, in utilizing the sensitive periods for educational purposes, she was actively promoting an approach to human development and education that appears to correlate with what Perry calls a "developmentally sensitive and biologically respectful approach to learning" (ThinkTVPBS, 2020a).

## Method

This paper compares some of the neuroscientific principles of the NME with practices in the Montessori Method to shed more light on the science behind Dr. Montessori's success with children. To do this, the author conducted an analysis of available sources on the NME. These sources comprised of books, articles, interviews, seminars, YouTube webinars, and online courses relating to the NME. In addition, the author conducted an analysis of four of Dr. Montessori's seminal books—*The Montessori Method* (1912/1964), *The Secret of Childhood* (1936), *The Absorbent Mind* (1949/1967), and *The Formation of Man*, (1949/1975)—and her pamphlet, *The Four Planes of Education* (1971, from a lecture delivered in 1938). These five publications were selected because they are generally recognized as reliable sources of Dr. Montessori's core concepts. Additionally, an analysis of Jean Marc Gaspard Itard's (1802) book, *An Historical Account of the Discovery and Education of a Savage Man*, and Édouard Séguin's (1866) book, *Idiocy and Its Treatment by the Physiological Method*, was also conducted because Dr. Montessori repeatedly stated that her work builds on the work of Itard and Séguin. These combined sources yielded a large amount of data. Braun and Clarke's analytical model on thematic analysis was used (Braun & Clarke, 2006, 2022). Specifically, the literature was examined, coded, and categorized into themes. Subsequently, the theoretical concepts (as outlined in the theoretical framework below) shaped the final identified themes.

## Theoretical Framework

This study is centered on the concept of offering children a developmentally sensitive and biologically respectful education as expounded by Bruce Perry in his Neurosequential Model of Education. It is also centered on Dr. Montessori's own original concept of providing children with a developmentally sensitive and biologically respectful education, which includes her utilization of "sensitive periods" in human development from the standpoint of education, as expounded in her seminal publications listed above.

## Results

The analysis identified three major themes: (a) The 6 R's of the NME, (b) How the 6 R's of the NME



align with the Montessori Method, and (c) How Dr. Montessori utilized sensitive periods in development to provide children with an educational approach that anticipates what Perry calls a “developmentally sensitive and biologically respectful approach to learning” (ThinkTVPBS, 2020a). We now review each theme.

### **The 6 R’s of the Neurosequential Model in Education**

The first theme identified from the analysis relates to the “6 R’s” of the NME. In an NME classroom, there is an adherence to 6 R’s. This means that the classes try to be the following:

- 1) Relational (promoting a sense of kinship and safety). NME educators are trained to build quality human relationships with their students, especially with the students who present the most challenges, because “Positive relational interactions” have been shown to promote “healthy development” in children (Ludy-Dobson & Perry, 2010, p. 27). For children who have been emotionally damaged, Perry and Szalavitz (2017) argue that “The more healthy relationships a child has, the more likely he will be to recover from trauma and thrive. Relationships are the agents of change, and the most powerful therapy is human love” (p. 258). Perry emphasizes “the primacy of human connectedness,” the power of “connectedness and belonging” (Perry & Winfrey, 2021, pp. 270, 249), and the importance of community (ThinkTVPBS, 2020c).
- 2) Rhythmic (resonant with neural patterns). NME educators are trained to utilize rhythm in their classes (e.g., walking, music and movement sessions, dancing, balancing exercises, yoga, drumming sessions, and group singing), because such activities “would be organizing and regulating input that would likely diminish anxiety, impulsivity” (Perry, 2009, p. 243).
- 3) Repetitive (having repeating patterns). NME educators are taught that the brain only changes through “patterned, repetitive activation” (Perry, 2009, p. 244). Educational content, therefore, should be offered as creatively as possible keeping this core concept of repetition in mind.
- 4) Relevant (developmentally matched to the child). NME educators are trained to be aware of the varying developmental levels of their students so they can offer content that is appropriate to the students’ level of comprehension (ThinkTVPBS, 2020e).
- 5) Rewarding (giving pleasure). NME educators are trained to keep at the forefront of their minds their

student’s need for success, knowing that the pleasure of learning something new will naturally lead to the desire to learn more (ThinkTVPBS, 2020e).

6) Respectful (of the children, their culture, and their immediate and extended families). NME educators are trained to respect the diverse cultural backgrounds of students and their families and to use these backgrounds as a springboard to learning (ThinkTVPBS, 2020a).

### **How the 6 R’s of the NME compare with the Montessori Method**

The second theme identified from the analysis of the literature relates to how the 6 R’s of the NME align with the Montessori Method. As stated above, in an NME classroom, the 6 R’s mean that the classes need to be relational, rhythmic, repetitive, relevant, rewarding, and respectful. In this regard, there is much commonality between the NME and the Montessori Method.

Firstly, an analysis of the literature selected and scrutinized for the purposes of this study shows that there is a strong commonality between the “relational” aspect of an NME classroom and the “relational” approach advocated by Dr. Montessori in her method. As early as 1897, when Dr. Montessori began to work with mentally challenged children, she realized the importance of positive, relational interactions between teachers and children. When describing her work with these children, she wrote,

*When these children from the streets and from the asylum entered my school they were greeted with hearty manifestations of welcome and with genuine cordiality. For the first time they were made to feel that they were wanted and desired.* (Montessori, 2008, p. 264)

She went on to describe how these children flourished emotionally, socially, and cognitively, even managing to pass the Italian State exams, much to the amazement of the public. Moreover, as early as 1904 in her lectures at the University of Rome (which later became the main content of Dr. Montessori’s 1913 publication *Pedagogical Anthropology*), Dr. Montessori stated, “What really makes a teacher is love for the human child” (Montessori, 1913, p. 34). She also recognized the power of love as a force for human flourishing. She wrote: “This force that we call love is the greatest energy of the universe” (Montessori, 1967, p. 290). She asks: “Why should it not always be a subject for study and analysis, so that its power can

become beneficent?” (Montessori, 1967, p. 290). She writes: “Every contribution able to bring out the latent power of love, and to throw light upon love itself, should be welcomed with avidity and considered of paramount importance” (Montessori, 1967, p. 290).

Dr. Montessori also recognized the fundamental importance of community and having a sense of belonging. In a rare Montessori article based on a lecture she delivered in Kodaikanal, India, in 1944, she stated, “In English, there is the famous sentimental expression ‘Home! Sweet home!’ For the adult, the idea of home rings with similar satisfactory notes. But where is the child to find an answer to his need? In the ‘House of Children,’ we endeavor to give to the child the relief of feeling, for once, ‘at home’” (Montessori, 2013, p. 11). In another publication, she repeatedly stated that her schools were not *houses* of children but rather *homes* for children with all the warmth, love, and sense of belonging that a good home signifies (Montessori, 1967). She made her schools into little communities where children felt they were useful, welcomed, and loved members of a social group (Montessori, 2008, p. 264), and they showed evidence in their social, emotional, and behavioral growth that they were flourishing as human beings (Montessori, 1964, 1936). These statements by Dr. Montessori (and there are many more) resonate strongly with what Perry has discovered about the healing power of love and the need for schools to be relational. Also, Perry, in agreement with Dr. Montessori, states that “the most powerful therapy is human love” (Perry & Szalavitz, 2017, p. 258).

Secondly, Montessori and Perry express similar views about the need for schools to make use of rhythmic exercises and activities. As far back as 1897, when she first worked with mentally challenged children, Dr. Montessori recognized the importance of rhythmic activities to calm the brain. Following and surpassing her predecessor Séguin, she made use of what Perry calls “patterned repetitive rhythmic activities” (Perry, 2009, p. 243). These take the form of rhythmic practical life activities (such as sweeping, scrubbing, dusting, pouring, spooning, buttoning), sensorial activities (cylinder blocks), cultural activities (movement to rhythmic music), prewriting activities (the rhythmic movements involved in the insets for design and “metal insets”), mathematical activities (the rhythmic movements involved in feeling sandpaper numbers and the patterned movements involved in matching cards and counters), and language activities (the rhythmic movements involved in feeling the shapes of sandpaper letters). Many early eyewitnesses to Montessori schools commented

at length on the rhythmic aspect of the curriculum (see Phillips et al., 2022).

Thirdly, regarding the need for schools to make use of repetition in their exercises and activities, Dr. Montessori, from early on in her work, expressed her observations about the role of repetition in children’s development and learning which are similar to ideas later emphasized in the NME. For example, in 1907, when recording her initial observations in the very first Casa dei Bambini, Dr. Montessori states that “the very first phenomenon that awoke my attention” was the young child’s natural tendency to repeat exercises and activities (Montessori, 1936, p. 126). She describes her incredulity when observing a young child repeating a cylinder block 42 times. She later observed this phenomenon in children’s other activities such as hand washing (Montessori, 1936, p. 128). She further observed that following this “repetition of the exercise...the children emerged as rested, full of life, with the look of those who have experienced some great joy” (Montessori, 1936, p. 127). From this moment on, she encouraged her teachers to allow children to repeat an exercise as many times as they wished because she recognized that repetition had psychological significance and seemed to meet an “inner need” in the child (Montessori, 1936, p. 128).

Fourthly, Montessori and Perry both argue that schools need to be relevant—that is, developmentally matched to the child. Very early on in her work in the Casa dei Bambini, Dr. Montessori recognized the necessity of giving children free choice in their selection of activities to ensure that the activities were developmentally matched to the child. She wrote: “The children had their special preferences and chose their own occupations. To enable them to do so, we later provided low, pretty cupboards in which the apparatus was placed at the disposition of the children, who could choose what corresponded to their inner needs. Thus, the *Principle of free choice* accompanied that of *Repetition of the exercise*” (Montessori, 1936, p. 129).

Fifthly, regarding the need for schools to be rewarding—that is, to give pleasure and a feeling of success producing good chemical responses in the child, Dr. Montessori and Perry share a commonality. Dr. Montessori repeatedly observed that the children, having engaged in activities of their own choice which allowed them the possibility of success, and having been allowed to repeat these activities for as long as they wished without interruption, became happy and joyful, “their faces alert and joyous” (Montessori, 1936, p. 153).

Sixthly, regarding the need for schools to be

respectful of the children, their culture, and their immediate and extended families, Dr. Montessori and Perry appear to be of the same mind. Regarding the child, Dr. Montessori wrote: “The child is truly a miraculous being, and this should be felt deeply by the educator” (Montessori, 1967, p. 121). Very early on in her work with the children in the first Casa dei Bambini in 1907, Dr. Montessori became aware of the young child’s acute sense of dignity and need for respect when she noticed how they were continuously reprimanded by adults for having “runny” noses and so decided to give them what she thought was a “humorous lesson” on how to blow one’s nose discreetly. Following the lesson, the children reacted with a burst of applause (Montessori, 1936, p. 134). Dr. Montessori stated that “afterwards, through long experience, I discovered that children have a profound feeling of personal dignity. . . . I had indeed touched these poor little children in their social dignity” (Montessori, 1936, p. 135). Dr. Montessori extended this respect to the children’s immediate and extended families by such simple things as “chatting” directly with the mothers of these children (something unheard of in her day) and instructing her teachers to have weekly meetings with the mothers so that they could discuss their children together (Montessori, 1964).

**How Dr. Montessori utilized “sensitive periods” in development to provide children with an educational approach that anticipates what Perry calls a “developmentally sensitive and biologically respectful approach to learning” (ThinkTVPBS, 2020a)**

The third and final theme identified from the analysis of the literature relates to how Dr. Montessori utilized “sensitive periods” to support a developmental approach that anticipates what Perry calls a “developmentally sensitive and biologically respectful approach to learning” (ThinkTVPBS, 2020a).

The concept of sensitive periods in development was first postulated in biology with regard to animal life. However, Dr. Montessori had a deep insight into the existence and importance of sensitive periods in the development of the human being. She wrote, “Man’s mind does not spring from nothing; it is built up on the foundations laid by the child in his sensitive periods” and claimed to be the first to discover “the sensitive periods of infancy” (Montessori, 1936, pp. 55, 34). She regarded sensitive periods as protective factors designed by nature to aid the optimal development of the human being. She defined sensitive periods as (a) critical periods or blocks of time in children’s lives when nature directs

them to focus their attention on areas that are vital to their normal development at a specific point in time; (b) temporary phases which wane and ultimately fizzle out when children have been given enough time to master the area necessary for their optimal development; and (c) windows of opportunity for learning and development because, during each of the sensitive periods, children experience an intense and extraordinary interest in the area that nature directs them to focus on, which causes them to repeat an activity until they have mastered it. Regarding sensitive periods, she wrote:

*It was the Dutch scientist Hugo de Vries, who discovered the existence of sensitive periods in animal life, but we ourselves, in our schools and by observing the life of children in their families, were the first to discover the sensitive periods of infancy, and to respond to them from the standpoint of education. These periods correspond to special sensibilities to be found in creatures in process of development; they are transitory and confined to the acquisition of a determined characteristic. Once this characteristic has evolved, the corresponding sensibility disappears. (Montessori, 1936, pp. 34–35)*

Dr. Montessori identified several sensitive periods in development during the first six years of life (Montessori, 1936). She saw the importance of making use of the sensitive periods “from the standpoint of education” (Montessori, 1936, p. 34) because she believed that children would never again experience a level of interest, concentration, or devotion to a specific area that they experienced while under the influence of its corresponding sensitive period.

**Dr. Montessori’s concept of a sensitive period for movement**

Édouard Séguin (1812–1880), a French physician who developed what he called the “Physiological Method” of education, greatly influenced Dr. Montessori. She translated word for word the lengthy French volume of his work (Séguin, 1866). For Séguin, the importance of movement and physiological exercises as a means of reaching the brain was fundamental. In explicating Séguin’s understanding of the importance of movement and muscular education, one of Dr. Montessori’s contemporaries wrote,

*The brain, the organ of the mind, is a part of the nervous system, and through this system alone can the mind of the pupil be reached. And in its turn the nervous system can be reached only through the muscles and senses; so that the education of the child must begin with the training and development of his muscular and sensorial powers. (Fynne, 1924, p. 145)*

Séguin's views on the importance of movement and muscular education were in accord with best twentieth-century thought. For example, in 1904, Professor Herman Horne, the American educational philosopher, wrote:

*All appeals to the mind, educational and otherwise, must be made through the agency of the nervous system. The senses on the one hand and the muscles on the other are the two first gateways through which educational influences must proceed. The educator who would climb up into the mind by some other way is unaware of the nature of the child with whom he has to deal. The training of the senses and the doing of things well that require delicacy of muscular adjustment are the two beginnings of physical education, and only a sound physical education can support a sound mental education. (Horne, 1904, pp. 61–62)*

This paper argues that Dr. Montessori took Séguin's principles a step further when she added to them the power of the sensitive periods in development which promote "repetition of the exercise" (Montessori, 1936, p. 126). By utilizing the sensitive periods, with their inbuilt compulsion towards repetition, as an aid to the development of the body and the mind, Dr. Montessori was clearly promoting an educational approach that shares features similar to what Perry calls a "developmentally sensitive and biologically respectful approach to learning" (ThinkTVPBS, 2020a).

From her meticulous observations of young children, Dr. Montessori became convinced that, from birth to 6 years, all children experience a "Sensitive Period for Movement" (Montessori, 1936) which is most acute between birth and 5 years. She noticed that during this period, children are intensely interested in and focused on perfecting their movements; therefore, they repeat certain movements. Following these repetitive actions, they appear to become calm and "very happy" (Montessori, 1936, p. 127). To facilitate this sensitive period, Dr. Montessori designed many activities and

exercises involving small and gross motor movements. These activities and exercises feature prominently in the practical life, sensorial, and cultural areas of the Montessori curriculum. They also feature in the language and math areas of the curriculum, especially in activities that utilize procedural or muscle memory—that is, a type of memory that involves committing a specific motor task into memory through repetition; for example, children learn to feel sounds/numerals by repeatedly feeling sandpaper letters/numbers and so developing a muscle memory of their shapes. In all these activities, repetition is paramount, because, as neuroscience now shows us, "interventions that provide patterned, repetitive, neural input to the brainstem... would be organizing and regulating input that would likely diminish anxiety" (Perry, 2009, p. 243).

To onlookers who knew of Dr. Montessori's years of research, the science behind the genius was evident. One witness wrote:

*When one visits these schools the life of the children seems so normal, so natural, and their activities at first glance so undirected, that it is easy to overlook the fact that behind all this, making it possible, lie years of preparation, of scientific training, of extensive experimentation, deep and earnest thought, reverent, unprejudiced observation. Perhaps no educator has ever approached a pedagogical experiment through such broad and remarkable training. It is characteristic of Maria Montessori's peculiar genius that her gifts as a scientist, a physician and a psychologist have always been but means through which she might help more vitally the lives of those about her. (George, 1912, p. 28)*

Another eyewitness, the highly respected American Kindergarten expert Ellen Yale Stevens, wrote that Dr. Montessori "realises the plasticity of the nervous system and the importance of building into its tissues" (Stevens, 1912, p. 81). Stevens appears to be using the word plasticity as we would today—to denote the quality of being easily shaped and molded. Solange Denervaud, a neuroscientist and former Montessori educator, whose work examines the impact of the Montessori pedagogy on the neural development of the child, emphasizes the importance of neuroplasticity in childhood. Denervaud reportedly said, "brain plasticity lasts until our death. But in reality, we build our foundations during childhood" (Galitch, 2021, p. 5). By utilizing the sensitive period for movement as an educational aid, Dr. Montessori was, in

effect, utilizing the brain's capacity for neuroplasticity to the maximum.

### **Dr. Montessori's concept of a sensitive period for the social aspects of life**

Édouard Séguin believed that social and emotional learning "affection" could be taught just as the refinement of the senses was taught:

*To develop their sense of affection . . . as were developed their senses of sight, hearing, and others, does not demand new instruments, or new teachers but the extension of the same action upon their feelings. To make the child feel that he is loved, and to make him eager to love in his turn, is the end of our teaching as it has been its beginning. If we have loved our pupils, they felt it and communicated the same feeling to each other; if they have been loved, they are loving. . . . For our pupils. . . . love alone can truly socialize them; those alone who love them are their true rescuers. (Séguin, 1866, pp. 244–245)*

Dr. Montessori took Séguin's ideas about social and emotional learning and built on them. From her meticulous observations of young children, Dr. Montessori became convinced that all children (from approximately 2 to 6 years) experience a "Sensitive Period for the Social Aspects of Life" (Montessori, 1936, p. 33). During this period, children are intensely interested in and focused on how we interact with and treat other people.

This paper postulates that Dr. Montessori was (and still is) unique among educators in that she used this sensitive period in children's lives to teach them how to show qualities like kindness, respect, and empathy by having children repeatedly act out kindness, respect, and empathy. She named these activities the Exercises of Grace and Courtesy. She also utilized specific collaborative activities, especially ones that involve movement, therefore combining the power of the sensitive period for movement with this sensitive period. For example, she encouraged and facilitated collaborative activities such as the carrying of tables, chairs, or large teaching materials out to the garden or preparing long tables for communal meals (Montessori, 1936). Similarly, through the Exercises of Grace and Courtesy, children embody the qualities of love, respect, kindness, empathy, and so on. For example, by teaching children the physical action of stepping aside to allow somebody to pass or of

closing the door quietly so as not to disturb others, we are, in effect, ingraining in the child's procedural memory the know-how of showing respect and kindness to others. The implications of this are immense.

It could be argued that we are laying the bedrock for preventing bullying in childhood, adolescence, and in the workplace in adulthood. It has already been shown that Montessori schools have significantly less "ambiguous rough play" than non-Montessori schools (Lillard & Else-Quest, 2006). Moreover, early eyewitnesses frequently commented on the lack of bullying in the early Montessori schools (see Phillips et al., 2022). It is arguable that this was a direct result of the emphasis on the Exercises of Grace and Courtesy which took place daily in authentic Montessori schools and enabled children to embody respect, kindness, and empathy towards others.

This approach is very different from that used in many playschools where children are constantly admonished to "share," "play nice," etc. Although these admonitions are well intentioned, they are often ineffective. The Montessori Exercises of Grace and Courtesy differ significantly in that these exercises, being made into physical actions rather than just admonitions, become part of the child's procedural memory. When children are exposed daily to patterned, repetitive exercises that embody kindness during this sensitive period when they are most open to learning empathy, the physical learning of empathy becomes hardwired into the child's psyche; it is difficult to eradicate because procedural memories are hard to unlearn (Grigsby & Stevens, 2001). This concept is important because research on memory suggests that procedural memory actually forms a person's character; these behaviors become "who we are" (Grigsby & Stevens, 2001, p. 102).

Denervaud and colleagues make some important observations on how school systems shape children's knowledge and creative abilities, which may have bearing on the topic under discussion. They write: "Children in a Montessori pedagogy are immersed in a more enriched and diverse school environment. They explore concepts through real life activities and interactions with their peers" (Denervaud et al., 2022, p. 1). She goes on to state that: "Children, by perceiving concepts and understanding more flexibly, may be more open to others" (Denervaud et al., 2022, p. 1). Perhaps we should think of the sensitive period for the social aspects of life as a period for social and emotional development because that is essentially what it is.

### **Dr. Montessori's concept of a sensitive period for order**

*The little child's need for order is one of the most powerful incentives to dominate his early life.*  
(Montessori, 1967, p. 190)

Dr. Montessori was convinced that there was nothing “haphazard” about the development of the human mind: “If the whole universe is governed by fixed laws, is it possible that the human mind be formed haphazardly, i.e., without any law at all?” (Montessori, 1975, p. 9). She argued that “Nature gives small children an intrinsic sensibility to order” (Montessori, 1936, p. 55) as an aid to their efforts to “construct” their own brains. It is arguable that that Dr. Montessori was (and still is) unique among educators in that she recognized and utilized the power of the sensitive period for order which promotes the repetition of orderly exercises and activities to aid children in the optimal construction of their brains, because in the larger, biologically driven picture, healthy brain development is needed for the continuation of a healthy species. She aided the development of children’s sequential memory by designing curricular activities that involve order and sequencing and by laying out the prepared environment in an orderly way. The following paragraphs elaborate on these points.

Dr. Montessori’s meticulous observations of children convinced her that all children experience a “sensitive period for order” (Montessori, 1936, p. 55; 1967, p. 190). This sensitive period begins at birth but is most noticeable between 2 to 4 years, often because of the distress its infringement causes to the child. It is arguably the most important of the sensitive periods and, regrettably, the least recognized or understood by parents and teachers alike. Dr. Montessori was convinced from her observations of young children that, during the sensitive period for order, nature programs young children to focus on patterns, routines, and sequences in their daily life to help them in their brain construction. Since children construct their brains from what they find in their immediate environment, it follows that if that environment is chaotic, children’s brain development may not be optimal. On the other hand, if children’s immediate environments are well ordered and there are no other endangering factors (such as genetic predispositions to abnormal brain development or other adverse conditions), children stand an excellent chance of having optimal brain development.

Once Dr. Montessori recognized this sensitive period for order, which only exists during the first plane

of development, birth to 6 years, (Montessori, 1971), she constructed her Case dei Bambini (Children’s Houses) to cater for it by embedding order onto every aspect of the environment, both indoors and outdoors. In practice, this means that the physical layout of the prepared environments for children in this age range is meticulously orderly. For example, the materials for each curriculum area (practical life, sensorial, language, mathematics, cultural) are laid out in an orderly fashion on sets of shelves. Each set is arranged sequentially from the most basic level of difficulty to the most complex. Each child is shown from the outset how to carry the materials carefully to a mat or a table to work with them and then how to replace them on the correct shelves when he or she is finished.

Many of Dr. Montessori’s contemporaries understood the groundbreaking significance of what she was doing. The assistant editor of the London Times Educational Supplement, having had talks with Dr. Montessori over the course of several months in 1919 about her method, wrote: “This is not merely a new way of amusing children—it is the beginning of a re-organization of the human mind” (Radice, 1920, p. 11). Order and sequence are to be found everywhere in an authentic Montessori environment. More importantly, this practice of sequencing is essential for the development of sequential memory, which is a vital element of healthy brain development and is particularly necessary for the development of literacy and numeracy skills.

**Sequential Memory—What It Is and Why it is Impaired in Some Children.** Craig (1992) explains the importance of sequential memory, a type of memory which can remember visual and auditory input in sequence, in the learning process: “A child’s successful completion of many academic tasks depends on the ability to ‘bring linear order to the chaos of daily experience’” (p. 67). She explains that in the first few years of life, sequential memory is not yet developed, and the brain records events “much like a series of snapshots that capture the essence of experience but may lack a linear sequence” (p. 67). The cognitive process that crafts these “snapshots” and into a linear sequence is sequential memory. Sequential memory is clearly not something we are born with. It is something that must be developed. Craig argues that there is a crucial need for stable, predictable, ordered environments and equally stable caregiving for the successful development of sequential memory: “The transition to sequential semantic memory is most easily made in environments marked

by consistent, predictable routines and familiar, reliable caregivers” (p. 67). She emphasizes that when these conditions are not available, sequential memory does not develop properly: “In the absence of these factors, children may continue to encode new information episodically or not at all” (p. 67).

As we know, many children do not grow up in stable environments. This is particularly true of children brought up in the care system and homes where there is substance misuse or mental health issues. In these circumstances, the threats to the development of sequential memory are serious. Craig (1992) also argues that children who grow up in homes where rules can vary according to the transient inclination of the caregiver will have difficulty developing sequential memory: “Children raised in households in which rules and routines are subject to the whim of the parent may lack the consistency and predictability required to move easily into a more sequential ordering of the world” (p. 67). This impacts both children’s ability to learn and especially their struggles to learn within a school environment that relies on sequential ordering. Craig argues that many children’s difficulties in school relate to their having what she refers to as “a learning style that is unresponsive to school environments that rely on sequential ordering” (p. 68).

**How the Montessori Method Aids the Development of Sequential Memory.** The emphasis on order in authentic Montessori schools, which necessarily involves carrying out activities in a sequence, leads to the development of sequential memory. For children whose exposure to a chaotic home environment has impeded the building of sequential memory, the Montessori school could be a significant aid to their development. Every activity the child engages in—whether it is scrubbing a table, washing a window, or polishing a mirror—involves a meticulously planned sequence of steps to enable not just the completion of the activity but, in the long term, to aid the development of a healthy brain. Therefore, in an authentic Montessori school, the disadvantages a child suffers from exposure to a chaotic home environment can be compensated for, daily, by the multitude of “sequencing” opportunities made available to the child through the Montessori materials and exercises.

## Discussion

This paper offers a unique contribution to the field of Montessori research by comparing some of the core principles and recommended activities of the

Montessori Method with some of the core principles and recommended activities of the now-acclaimed NME. The author is unaware of any other study that does this. The paper also examines Dr. Montessori’s unique use of sensitive periods in development for educational purposes (in particular, her use of the sensitive periods for movement, the social aspects of life, and the sensitive period for order respectively) and argues that, in utilizing the sensitive periods for educational purposes, she was actively promoting an approach to human development that appears to anticipate what Perry calls a developmentally sensitive and biologically respectful model of education.

In many countries, there has been a move away from authentic Montessori practices, including the facilitation of sensitive periods. This, it could be argued, is resulting in poorer outcomes for children. Often, this is because of national policies relating to early years curricula. For example, many teachers feel they are under growing pressure to apply curricula that (a) take no heed of the sensitive periods in development or (b) trample over the sensitive periods in development—in particular the sensitive period for order, which is most vulnerable to being ignored by teachers and parents alike. Frequently, Montessori teachers feel that they have no choice here. A country’s early years curriculum is often designed by people who have no knowledge of Dr. Montessori’s discoveries, especially in relation to sensitive periods and the sensitive period for order in particular.

In addition, Montessori teachers often report that parents are often suspicious, or even afraid, of classrooms that look too structured or too tidy. Also, there may be a perception among parents that a structured classroom will not support a play-based curriculum, and so teachers are nervous of making their classrooms look too tidy or structured. Because of this, many teachers (some interviewed by the present author) state categorically but wistfully that they can no longer prioritize the sensitive periods, especially the sensitive period for order, when laying out their environments.

If the sensitive periods in development, and in particular the sensitive period for order, are a vital developmental need in children under 6 years, then it follows that failure to recognize and support sensitive periods may be a failure to meet children’s developmental needs and therefore may be harmful to children. It is vital to make teachers and the public aware of the power of sensitive periods in development for all children, especially for those with developmental problems, in a

similar way to that by which Perry is making teachers and the general public aware of the basics of brain development in children.

In conclusion, the findings of this study suggest that the NME and the Montessori Method share many commonalities. Specifically, Perry's findings in relation to the vital importance of positive relational interactions between adults and children to promote healthy human development are in line with Dr. Montessori's early emphasis on the necessity for the teacher to feel and demonstrate, in daily practice, a genuine love for the human child. The 6 R's recommended by the NME align with original Montessori principles which emphasize that the children's houses were relational, the activities were rhythmic, repetitive, relevant, and rewarding, and every aspect of the environment was respectful. This paper would argue that the neuroscience behind the NME sheds light on the early success of the Montessori Method in bringing social, emotional, and cognitive flourishing to large numbers of children. In addition, this gives reason for great optimism that the Method still has the power to promote human flourishing in our current times because Dr. Montessori's "scientific pedagogy" is still entirely replicable.

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# Book Review

## *Visual Thinking Strategies in Montessori Environments*

*(National Center for Montessori in the Public Sector Playbooks)*

by National Center for Montessori in the Public Sector and Philip Yenawine

National Center for Montessori in the Public Sector, 2022, 80 pp., 8.5 x 11 inches, US\$29.95 (softcover), ISBN 1733869123

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**Keywords:** *Visual Thinking Strategies*

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Young people today are inundated with visual images in television shows, advertisements, and social media, as passive consumers and as future citizens. This steady stream of visual stimulation begs several questions: Where are opportunities for students to become engaged with visual content? How can they develop curiosities around visuals that scaffold critical thinking and visual literacy activities? How can educators do this in a formal classroom environment to promote the growth of visually literate future citizens? Using almost 30 years of research, the National Center for Montessori in the Public Sector (NCMPS) and Philip Yenawine present the case for visual thinking strategies (VTS) as an opportunity to apply these strategies in the Montessori learning environment by centering engagement with art. The overall goal of VTS is to provide an accessible, transformative learning experience through an open-ended discussion of visual art that increases a student's literacy, language, and critical thinking skills.

VTS is a student-centered pedagogy in which the instructor selects a piece of art and then facilitates an inclusive discussion with carefully selected questions. Considering VTS and Montessori together creates a convergence of two pedagogies in which discussion, analysis, and writing about art are conduits to improving visual and critical thinking and enhancing language and social development.

VTS aligns well with the Montessori approach of integrating and discussing art throughout the curriculum, and this Playbook supports educators in developing their skills to incorporate these strategies in their classrooms. Five chapters comprise *Visual Thinking Strategies in Montessori Environments*. Chapter 1 connects VTS and the Montessori environment. Chapter 2 provides guidelines for facilitating lessons, and Chapter 3 connects the VTS approach with language development. Chapter 4 focuses on assessing VTS. The last chapter reflects on the future of the Montessori environment, imagination, aesthetic development, and human potential.

### ***What's the Connection Between VTS and Montessori Education?***

In the past two decades, connecting art and the social studies curriculum through means such as the Visual Discovery method has become increasingly popular throughout traditional schools in the United States, often in textbook series. Created by TCI, the Visual Discovery method guides students to collect evidence, make inferences, and create hypotheses by analyzing visuals and sharing their thoughts through engaging activities such as graphic reading notes and dramatic role play (Hayes et al., 2010). The Visual Discovery method often focuses on primary sources as artifacts, using academic language within the content area. Although engaging, this activity is often manufactured, with limited visual primary sources in prescriptive textbooks based on narrow state standards. The Visual Discovery approach lacks the depth, preparation, and formal training of VTS. The drawbacks of the Visual Discovery method have been widely discussed as a problem within traditional social studies classrooms (Bickmore et al., 2017; Roswell et al., 2012; Suh, 2013). All of traditional education, not only social studies instruction, could benefit from a holistic approach to VTS.

VTS is a more authentic and holistic approach to visual source analysis than the Visual Discovery method. It is also grounded in cognitive science. When interwoven with the Montessori Method, VTS is open-ended, purposeful, and powerful for generating human creativity as well as criticality.

*Visual Thinking Strategies in Montessori Environments* focuses on the connection between VTS and Montessori education. The authors describe the strengths of both models of learning but argue that they are greater together: “We have gained an appreciation of how the two pedagogies align in purpose and in practice, putting students at the center of learning and creating opportunities for them to engage in critical thinking, complete conversations, and meaningful collaborations” (p. 2). The authors acknowledge that some readers may have gone through VTS training, so a goal of the book is to provide a companion guide that highlights connecting to, and focusing on, the Montessori learning environment, where art and the appreciation of art are central to learning culture and language. However, the authors acknowledge that this book is not a substitute for formal VTS training.

NCMPS and Yenawine further provide a rich history of the development of VTS at the intersection of

museum-education practices and cognitive-psychology research with a focus on visual thinking—where “looking...shapes thinking” (p. 6). VTS proposes that looking, thinking, and talking, especially in a group, contribute to impactful social learning. Careful thought goes into connecting visual thinking and the three planes of childhood that form the foundation for Montessori education with attention to learner development, opportunities for growth, and connections to research (pp. 9–13). The sections that follow highlight pieces of each chapter, with commentary.

### ***How Do I Facilitate a VTS Session?***

Chapter 2 provides the “how” of the VTS pedagogy and detailed guidelines for facilitating lessons in a Montessori environment. When considering the imagery to use in teaching, the authors remind users to be provocative and engaging with their selections, to meet students where they are by selecting work that may connect with their existing knowledge but with enough ambiguity to lead to rich discussions. Educators can support students’ curiosities, depending on their age, through cycles of questioning: “What is going on in this picture? What do you see that makes you think that? What evidence supports that? What more can we find?” (p. 18). Just as important as the questions, the authors remind readers of the responsibility of the instructor to actively listen, direct attention to the visual, paraphrase student comments, and be neutral in their interactions. Of particular note in this chapter is the focus on “the art of paraphrase” (p. 21) and “basic orienting vocabulary” (p. 25). How educators facilitate student-centered learning through open-ended questions and their ability to respond to students by paraphrasing their ideas are key to validating student thought. Particular care must be taken in activities such as these because they help build and maintain focus. This chapter provides examples of how to effectively facilitate a VTS session and how not to, including the consistent vocabulary necessary to describe what, and how to see a visual. Illustrative examples are also provided.

### ***How Does VTS Relate to Language Development?***

In Chapter 3, the authors explore the intersection of VTS and language development at each plane of development and focus on the various educational opportunities offered for each age group. For the birth-to-age-3 level, the authors provide readers with an appreciation of visual acuity’s role in language

acquisition, specifically related to the importance of naming and engaging in dialogue and the role of prepared Montessori environments. Because early childhood “is a time of rapid and often dramatic growth in thinking and communicating” (p. 36), the authors discuss the language explosion and emerging vocabulary at this stage (Montessori, 2017, p. 86). The authors emphasize the importance of conceptual and social exploration for Elementary students. As part of this discussion, the authors examine the role of classroom communities in creating and inspiring a literate culture and the social nature of learning a language. Related to older children and adolescents, they say that “it’s a time to practice intentional listening, increasing sophisticated interpretation and articulation of ideas, and collaborative processing. It is a time of very rapid and often dramatic growth in thinking and communicating” (p. 36). When older students become more comfortable with the VTS process, they can create “looking circles” (p. 39), like literature circles or book clubs, in which to practice looking and thinking skills with peer groups. The curiosities sparked by VTS in Elementary and Adolescent students provide both informal and formal writing opportunities like journaling, reflections, analysis, and synthesis of content.

### **How Do I Assess VTS?**

The authors explain methods of data collection and assessment through direct observation for tracking student learning in Chapter 4. Key to this process are teacher reflection and paraphrasing what the student says: “When we listen intently to accurately grasp a child’s thoughts, and as we consider how to rephrase the comment, we are briefly seeing and thinking as the child does. We are following the child” (p. 46). Regarding the expansion of children’s visual literacies, NCMPS and Yenawine present several VTS tools for “keeping track of this developmental arc” (p. 46) and monitoring student thinking by analyzing writing. It is extremely helpful that the authors not only outline the process but also provide several in-depth tools for, and examples of, assessing discussion and writing, including tracking types of talk, pre- and post-writing samples, writing rubrics, and progress reports. This tool kit gives educators rich examples of how to apply and assess VTS to capture student growth through various measures that are appropriate for tracking student progress in a Montessori environment, as well as for evidence-based decision-making in a traditional classroom.

### **Further Reflections**

In the brief last chapter of this book, NCMPS and Yenawine restate their case for VTS in the Montessori environment. One area of needed future research is the potential social benefit of VTS research, which is rarely studied but often anecdotally discussed in Montessori schools. The authors also remind us of the challenges of careful listening and the need to purposefully model listening skills. Last, to realize the more peaceful world that Maria Montessori envisioned, they ask educators to cultivate opportunities for imagination in their students. If we are to invest in humanity, we must teach children empathy and care—and VTS can have a role in that.

In *Visual Thinking Strategies in Montessori Environments*, NCMPS and Yenawine create a practical text that provides readers with the foundations and procedures to create, facilitate, and assess VTS. The examples throughout are valuable to the hesitant practitioner, and the suggestions for further readings provide the curious mind with additional theoretical and empirical works to explore. For the trained (or untrained) VTS Montessori educator, this text is a logical guide to supplementing instruction or introducing the strategies for the first time. Realistically, this volume is more than a supplemental guide for Montessori educators; any educator can use this Playbook as a framework for fostering visual literacy in their learning environment.

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