Our Roots in Research
The Ideas and Evidence Behind Wildflower Schools

Wildflower Schools
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American society is at a critical juncture. We face great and growing challenges, including climate change, rising income inequality, polarization, humanitarian crises, and security threats from across the globe. To a significant degree, our ability to respond to these challenges depends on our education system: the brilliance of our future scientists, the creativity and capability of our entrepreneurs and innovators, and the capacity of each of us to participate in our democracy and to remain optimistic and resilient as we do. Unfortunately, our education system does not consistently and equitably produce graduates ready to meet these challenges.

The current American education system was designed for a prior era, when basic training in literacy and numeracy was sufficient preparation for farm and factory work. Signs of its inadequacy for the present and future are everywhere: Despite the extraordinary economic incentives attached to academic success, for example, many children, particularly children of color in low-income communities, are disengaged from school. Employers are dissatisfied with the workforce-readiness of recent graduates. Stress levels among children are at epidemic levels. Teacher satisfaction is at the lowest level ever recorded, driven by a widely-shared sense that schools do not teach the right things or operate in the right ways.

For many decades now, political, business, and community leaders have called for reforms: for larger, more efficient schools and then smaller schools; for more play-based early childhood education or more rigorous academic instruction in early childhood education; for more project-based learning or more direct, standards-based instruction; for more accountability or more autonomy, or both, or neither; for better management or total decentralization, etc. Despite near-constant reforms, and a long-term trend toward substantially greater levels of investment, the fundamental contours of our education system have changed very little.

From the moment of its germination in the greenhouse of the MIT Media Lab, Wildflower’s spirit has sparked a more holistic rethinking of the purpose and methods of education, starting from the foundational questions: What is the purpose of childhood? What supports the healthy, optimal development of human beings—individually and collectively? If we could free ourselves from all of our accumulated notions about school, how would we want the children we love—our own and others—to spend their days?

Wildflower finds our answers in the common ground that exists among Eastern, Western, and indigenous philosophical traditions, the latest research from the science of learning and human development, and the 100 year-old Montessori method. From these sources, we’ve developed an educational model that is radically different—a decentralized network of teacher-led microschools; grounded in the values of growth and connectedness; providing Montessori teachers with cutting edge technologies that help teachers observe student progress; equally committed to supporting the development of children, families, and teachers; blurring the boundaries between school, home and community; made accessible to all families through creative use of a wide variety of public funding streams and creating inclusive learning environments for intentionally diverse communities that live and teach a commitment to equity.

Wildflower didn’t start out on a quest to be different; we ended up there as we discovered how far our hearts and minds pulled us away from the educational system to which we’ve grown accustomed.

Because Wildflower is so different from the prevailing model of education in so many different ways, we need a strong, connected community of peers who share feedback with us and conduct research. Such a community helps us test our intuition, evaluate new ideas and incorporate external insights. The purpose of this paper is to foster the development of that community, by introducing the rationale and research behind each aspect of Wildflower’s educational model and inviting others into partnership with us as we seek to refine and improve our approach.

We thank you for interest in our work, and we look forward to traveling with you on Wildflower’s unfolding journey.

Sincerely,

Matt

Matthew Kramer
CEO
Overview

A Wildflower School is based on a powerful set of ideas about how developing children thrive in an enriched environment, where they are guided by caring adults and inspired by the landscapes that they traverse each day.

These ideas sit at the nexus of both philosophy and science. On the one hand, Wildflower’s model emanates from a set of beliefs, values, and aspirations about what we want for children and communities. On the other hand, most of Wildflower’s core ideas are grounded in research, deriving insights from the fields of human development, learning science, and organizational theory, among others. In a few cases, the beliefs are based on working hypotheses that can be tested as Wildflower Schools expand and grow.

The purpose of this paper is to introduce the research base behind Wildflower’s educational model. The school model is divided into four categories: 1) the role that both children and adults play in their own education; 2) the carefully-prepared classroom environment; 3) the relationship between the classroom community and its families, the surrounding neighborhood, and the broader global community; and 4) the way classrooms are organized into decentralized networks of one-room schoolhouses. In each category, the paper describes the key components of the model, the research that informs the approach, and the open questions Wildflower seeks to answer. This paper is an invitation for feedback to spark conversation and dialogue.

The individuals who work at Wildflower Schools remain nimble in their belief systems and open to compelling research and evidence that might change such beliefs. In the spirit of Dr. Maria Montessori, the Wildflower team embraces the scientific method, carefully observing, testing, and modifying their approach.
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Todd Rose, PhD

About the Author

Dalia Hochman, PhD, is a writer, researcher, and consultant with particular expertise in innovative school models. She was the lead author of Science of Summit, an exploration of the research behind Summit Learning. Dr. Hochman previously served as the Director of K-12 Model Development at Next Generation Learning Challenges, supporting many of the nation’s most innovative new school models.

A Note on Education Research Methodology:

Studies cited in this paper rely on a range of research methodologies. We reference randomized, controlled trials; matched-comparison studies; as well as more qualitative case study analyses. The diversity of research methods referenced in this paper reflects the reality of the field of education research writ large. For a more complete discussion of the challenge of education research, see Ellen Condliffe Lagemann and Lee Shulman, Issues in Education Research: Problems and Possibilities, 1999.

Research Base

Child-Centered and Adult-Supported
American Institute for Research, 2017
American Psychological Association (APA), 2015
Culclasure et al, 2018
Farrington et al, 2012
Lillard 2017
Roediger, 2015
Rose, 2016
Schwartz et al, 2016

School-Home-Community Connections
Alexander, 1977
American Psychological Association, 2015
Henderson and Mapp, 2002
Schwartz et al, 2016

An Enriched Environment
American Psychological Association, 2015
Culclasure et al, 2018
Dee & Penner, 2016
Fisher et al, 2014
Ladson-Billings, 1995
Lillard, 2017
Muller and Kerns, 2015
Schwartz et al, 2016

A New Organizational Structure
Borgatti and Halgin, 2014
Fullan, 2015
Laloux, 2014
Leithwood & Jantzi, 2009
Pink, 2011
Ray, 2017
The History of Wildflower Schools

In 2014, Massachusetts Institute of Technology (MIT) professor Sep Kamvar, together with a group of teachers, parents, and community members, developed a new model of school. The Wildflower School model was inspired by a set of beliefs about how children and their families can thrive in a connected learning community. Kamvar and his team carefully reviewed research from a diverse array of fields including education, psychology, urban design, organizational theory, and peace and justice studies, among others. The founding team was influenced by the following key thinkers, philosophers, scientists, and writers:

- Maria Montessori’s philosophy and methodology of education played a singular role in the development of the first Wildflower school that opened in Cambridge in early 2014. The founding team was deeply influenced by Montessori’s entire cannon of work. In addition, Professor of psychology Angeline Lillard’s Montessori: The Science Behind the Genius provided a more empirical analysis of the up-to-date research supporting Montessori’s approach (2005, 2017).

- In A Pattern Language (1977), professor of architecture Christopher Alexander describes a set of patterns that constitute a city developed based on organic and biological growth, rather than on industrial growth. Kamvar borrowed the idea of a shopfront school directly from Alexander.

- Mahatma Gandhi’s discussion of Satya (truth) and Ahimsa (non-violence) helped to inform Wildflower values of awareness and kindness.

- Martin Luther King Jr.’s writing influenced Wildflower’s intentional focus on addressing social ills, oppression, racism, and inequality.

- Frederic Laloux’s 2014 book, Reinventing Organizations, was published after the first Wildflower school opened, but gave language to the organizational theory underlying the school model. Specifically, Laloux’s ideals of a Teal organization, and the practices of self-management (advice process, roles and responsibilities, conflict resolution), wholeness, and evolutionary purpose all provided a lexicon for Wildflower’s organizational model.

- In Small Is Beautiful, E.F. Schumacher outlines the importance of human-scale technologies. Wildflower’s shopfront model is intended to be a human-scale technology along the lines of Schumacher.

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1 The original Wildflower School model was first publicly described in 2014. See Sep Kamvar, Wildflower: An Open, Peer-to-Peer, Shopfront School Model based on Montessori Philosophy.
The first Wildflower School opened in Cambridge, Massachusetts in 2014. The school was founded by two veteran Montessori teachers who approached their work with a respect for and a commitment to authentic Montessori practice. At first, Wildflower diverged from Montessori orthodoxy in several ways; Wildflower had a much smaller class size than is preferred in Montessori schools and had two lead teachers instead of the Montessori practice of a lead teacher and an assistant. Wildflower also actively explored the possibility of introducing new Montessori materials to teach computational thinking. Over time, class sizes have grown to be more in line with typical Montessori practices, co-teaching practices have been modified so that teacher-leaders take turns in the lead teacher role, and the standards for introducing new Montessori materials have been raised, so that current Wildflower practices align very closely with authentic Montessori practice.

Innovation in the first school came in two main areas. First, Wildflower sought to be more specific about how to implement some of Dr. Montessori’s ideas. For example, while it is common practice in Montessori schools to bring plants into the classroom, Wildflower developed a particular “living classroom” design that immersed students in a “natural” indoor environment. Other examples of this include classroom aesthetics and the use of data to refine instructional practice. Second, Wildflower sought to develop new approaches in areas outside the scope of Montessori’s classroom practices. For example, Montessori does not have anything to say about the role of teachers in school-level administrative decision-making, and Wildflower has developed a model where the scope of teacher authority in school level decision-making is particularly broad. Other examples include Wildflower’s focus on intentional student diversity, the shopfront school model, and the explicit teaching of anti-bias and anti-racist practices.

Since then, 21 schools have opened across the country with additional schools opening each year. The model has been designed to exist in a variety of governance structures such as a public charter school, a public district school, and an independent school. Based in Minneapolis, the Wildflower Foundation provides operational and financial support to all Wildflower schools. Each school site, however, retains its autonomy and is led by two or three individual teacher-leaders.
The Evidence Base on Montessori Schools

Ever since Maria Montessori developed her approach over 100 years ago, researchers have been eager to compare student outcomes in Montessori classrooms with those in traditional classrooms. Setting up rigorous studies has proven a challenge because, until recently, Montessori schools in the United States have predominantly been independent, creating a selection bias in terms of the types of families that might choose a Montessori education. In recent years, growth in the number of public sector Montessori schools with non-selective admissions processes has created a better environment for research on student outcomes.

Findings from the new wave of research have shown statistically significant benefits for students in Montessori classrooms when compared to those in traditional classrooms. Students in Montessori schools outperform students in traditional schools on measures of literacy and numeracy as well as on additional measures of executive function and creativity. A recent evaluation of public Montessori programs in South Carolina, over a five-year period, found higher levels of growth in Montessori classrooms compared to traditional classrooms. The findings were consistent even when the data were disaggregated by income, race, gender, and other variables (Culclasure et al. 2018). A separate study conducted in Hartford, Connecticut compared outcomes for 70 students who gained entry via a blind lottery to public Montessori schools with 71 students who lost the lottery and attended other public, private, and Head Start preschools. All of the Montessori schools were considered “high fidelity” Montessori programs, thus reducing variation across schools. The researchers analyzed the results from standardized measures of academic achievement, theory of mind, mastery orientation, liking of school, creativity, and executive function.

The results of the study were impressive: After matching Montessori students to demographically similar non-Montessori students and controlling for student demographics and previous test scores, the researchers found that Montessori students scored significantly higher on English Language Arts standardized tests than did non-Montessori students across all three years of the analysis. There was a significant Montessori advantage in math and social studies in two of the three years. The results for science were mixed, as Montessori students demonstrated significantly less growth than non-Montessori students in one year (2013-14) and significantly more growth in another year (2015-16). Subgroup analyses indicated that low-income Montessori students scored significantly higher than low-income Montessori students in ELA, math, and social studies. While these differences are statistically significant, the differences are generally quite small, as the effect sizes typically range from .05 to .08 standard deviations. For more information, see: https://riley.furman.edu/sites/default/files/docs/MontessoriOverallResultsFINAL.pdf

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standardized tests than did non-Montessori students across all three years of the study. Furthermore, there was a significant advantage in math and social studies in two of the three years for Montessori students, compared to non-Montessori students.

The Montessori students also demonstrated higher levels of executive function, were more persistent in the face of challenge, and reported liking school at higher rates. The academic results held for all groups, but were especially impressive for low-income students: lower-income students who spent three years in Montessori schools significantly closed the achievement gap with higher-income students (Lillard et al., 2017).

In their study, Lillard et al. discuss the common concern that studies comparing Montessori with non-Montessori schools are methodologically flawed because of the selection bias favoring teachers who choose to become Montessori teachers and receive rigorous Montessori training. For a review of the authors’ discussion on this point, see: https://www.frontiersin.org/articles/10.3389/fpsyg.2017.01783/full#B30

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3 Academic achievement across preschool by school type. The figure shows significantly greater growth in academic achievement across preschool for children enrolled in Montessori preschool (dashed blue lines, n = 70) than waitlisted controls (dotted dark red lines, n = 71). Groups were statistically equivalent at Time 1 (the non-significant difference at Time 1 is likely due the Time 1 tests occurring into mid-December, thus school programs could already have made a difference) and Time 2 (late in the spring of their 1st year in preschool) and significantly different by the end of their 2nd and 3rd years in preschool (Times 3 and 4). Dashed/dotted lines represent actual data and solid lines represent fitted linear growth curves. Standard error bars are shown.

4 In their study, Lillard et al discuss the common concern that studies comparing Montessori with non-Montessori schools are methodologically flawed because of the selection bias favoring teachers who choose to become Montessori teachers and receive rigorous Montessori training. For a review of the authors’ discussion on this point, see: https://www.frontiersin.org/articles/10.3389/fpsyg.2017.01783/full#B30
Supported by a new organizational structure.

That connects the school, home, and the community...

Learning in an enriched environment...

A child-centered, adult-supported educational experience...

Supported by a new organizational structure.
A Child-Centered, Adult-Supported Educational Experience

Following authentic Montessori practice, Wildflower schools create educational environments in which:

• Each child is treated as an individual who develops at his or her own pace;

• A child’s development is considered as a series of interrelated processes; for example, physical movement and social-emotional development both affect learning and cognition;

• Children exercise considerable choice and agency over their learning;

• Competencies such as executive function are considered to be as important to long-term success as more traditional academic skills; and

• Careful observation of students produces data that enable teachers to guide a child’s development.

The Child as an Individual
A central belief at Wildflower Schools is the idea that all children are competent, capable individuals who, in appropriate environments, will learn and thrive. This belief is grounded in the 100 year-old Montessori tradition. According to Dr. Montessori, the purpose of an education is to bring human activity into accord with nature (Montessori, 1949). At Wildflower, a child-centered philosophy means that each child is treated as an individual with a unique developmental pace and direction.

Focusing on children as individuals is a fairly radical idea amid the prevailing norms in American education. The widespread industrial model of education, established by the reformers of the early 20th century, organizes schools around the idea that children should be grouped and taught in age-based cohorts (Cremin, 1961). Traditional models of education often make decisions based on average performance across large groups of students, masking key differences between individual students (Rose, 2016).

The American Psychological Association (APA) has recently validated the Montessori approach to treating children as individuals. According to APA guidelines, “students’ cognitive development and learning are not limited by general stages of development” (APA, 2015). The multi-age groupings in the Montessori method allow children to develop at their own rate, regardless of their birth date. The idea of “mastery-based learning” has gained significant popularity in recent years. It is important to note that a common critique of allowing students to learn at their own rate is that it potentially lowers the standards for some students and/or does not require every student to master core concepts or standards. Montessori classrooms avoid this concern through reliance on a structured, sequential series of learning activities that require mastery of certain prerequisite skills before students are allowed to move on.
Movement and Cognition
Maria Montessori understood a child’s development to be holistic; cognitive development does not take place in a vacuum, but is inextricably linked to other developmental changes that a growing child experiences, such as in the development of motor skills. In Montessori classrooms, students are free to move around, sit where they want, and even stretch out on the floor or rug. Montessori work, especially for younger children, involves the manipulation of objects and attention to fine and gross motor skills. For example, the youngest children first learn to identify the alphabet by tracing sandpaper letters with their hands. Table washing and other activities related to Practical Life involve movement and physical activity. In Dr. Montessori’s original classrooms there was no formal recess or physical education but children could instead freely move between the indoors and outdoors as they explored topics of interest. In a traditional educational model, where children are required to sit in one place for extended periods of time, recess serves as a break period. In a Montessori classroom, however, children are constantly engaged in movement that is authentically connected to the object of their learning.

Abundant research shows that movement and cognition are closely intertwined. People represent spaces and objects more accurately, make judgements faster..., remember information better, and show superior social cognition when their movements are aligned with what they are thinking or learning (Angeline Lillard, 2017).

Attachment and Belonging
Besides acknowledging the importance of movement, the Montessori approach also incorporates social-emotional learning (SEL) into all aspects of a student’s learning. In this regard as with so many other insights, Maria Montessori was well ahead of her time. Recent psychological research has shown the profound importance of relationships on human learning. Learning occurs within a social construct, and the deep relationships students form with peers, teachers, and others are critical to the process (Farrington, 2012; APA, 2015; AIR, 2017).

Researchers have studied the features of relationships that best support successful learning. They have found that warm, consistent, and attuned relationships help children build strong brain architecture (The Center on the Developing Child, 2004). Such a finding builds on the research on the most successful types of parenting styles in which adults demonstrate both warmth and control (Baumrind, 1991). Finally, peer-to-peer relationships, where peers help tutor one another and engage in collaborative work projects are superior to whole-class instruction in terms of the learning outcomes that are attained and the social climate that such methods create (Lillard, 2017).

At Wildflower, students engage in deep, meaningful relationships with both adults and other children. Teachers, called “Guides” in a Montessori classroom, stay with the same cohort of students over several years, allowing the adult to observe student progress and individualize learning based on a detailed understanding of a student’s areas of strength and areas in need of support.

American Psychological Association, 2015
20 Principles for PreK-12
Teaching and Learning

Learning is situated within multiple social contexts (Principle 13).

Interpersonal relationships and communication are critical to both the teaching/learning process and the social-emotional development of students (Principle 14).

Emotional well-being influences educational performance, learning, and development (Principle 15).
Moreover, teachers develop close relationships with parents and guardians, allowing the child to experience consistency as all of the adults in a student’s life work together in support of the student.

**Choice and Interest in Learning**
Successful learning involves student choice which awakens a student’s individual interest and serves as an intrinsic source of motivation (Lillard, 2017). In Montessori classrooms, students exercise a considerable amount of choice in determining the type and sequence of work they will focus on at a given time. Significant research on motivation demonstrates that when children perceive themselves to be in control, they are more intrinsically motivated, view themselves as more competent, and express a greater sense of self-worth (Deci, Schwartz, Sheinman, and Rayna, 1981).

A student’s level of interest in a given topic activates a positive physiological arousal mechanism that consolidates memory and supports learning processes (Schwartz et al, 2016). The combination of a student both choosing his or her own topics of study coupled with a high degree of interest in the given topic, will lead to intrinsic motivation for learning. Intrinsic motivation for learning is far superior to more traditional educational approaches that rely on extrinsic motivation such as external rewards, prizes, and charts. For a thoughtful discussion of the rationale behind the benefits of intrinsic motivation see Lillard (2017) and Schwartz et al (2016).
Executive Function

Executive function has become a buzz word in American education and popular culture. The term specifically refers to a set of processes that allows an individual to plan, organize and implement longer-term goals even in the face of short-term distractions. Formally, executive function is defined as “cognitive processes that are required for the conscious, top-down control of action, thought, and emotions that are associated with neural systems involving the prefrontal cortex” (Muller and Kerns, 2015). Researchers have shown that young children with higher levels of executive function have better outcomes on a host of longer-term measures such as academic performance, social competence, and even health outcomes (Lillard, 2017).

Executive function requires the ability to maintain focus over long periods of time, despite competing considerations and even in the face of distraction. Developing these capabilities through three-hour blocks of uninterrupted work time is a hallmark of the Montessori classroom.

Open Questions:

We invite colleagues to engage with us on the following key research questions:

1  Mastery-Based Learning is currently a popular idea in K-12 education. In what ways should Wildflower Schools join forces with this movement? The Montessori approach has a very specific method of implementing mastery-based learning and takes a more holistic approach to mastery that extends beyond simply the pace of a child’s progression.

2  How should Wildflower thoughtfully partner with other organizations who have similar notions of student individuality (but not entirely the same models)? Who are Wildflower’s allies in this work?

3  How could technology be thoughtfully employed to help support the desired outcomes described in this section? What existing tools might support Wildflower’s approach?

Careful Observation of the Child

In Montessori schools, teachers are trained to make detailed observations of student choice-making, concentration development and learning so that data can inform teachers’ practice. While data-based decision-making in education has enjoyed significant popularity over the past few decades, evidence suggests that it is most helpful when used in a formative, low-stakes manner to support daily decisions and provide feedback (Rand, 2006). Wildflower uses data for improvement rather than for high-stakes decision-making.
Learning in an Enriched Environment

A child’s physical environment has a profound impact on his or her learning. A focus on the environment in a Montessori school is a key distinction between Montessori and the dominant model of education which emphasizes relationships between teachers and students over the environment. Maria Montessori used the term “prepared environment” to mean that educators must intentionally set up a classroom with the appropriate educational experiences and opportunities, and with a lay-out, furniture, and design optimized to foster learning and independence. Specially-designed pedagogical materials serve as the backbone of the entire approach, especially for younger children. A child’s progress in working with the materials creates a natural method to document his or her progression over time.

Wildflower adds the following components to Montessori’s emphasis on the classroom environment:

• A focus on mindfulness for students and adults;
• Special attention to the aesthetics of classroom design;
• Integration with the natural world;
• Intentional diversity and inclusion among students and teachers; and
• A curriculum focused on equity and social justice.

The Montessori Prepared Environment: Order in Environment and Mind

A popular misconception about a Montessori classroom is that it lacks order or structure. In fact, the opposite is true. While students in a Montessori classroom have long periods of free, uninterrupted time, the environment contains inherent structure. Montessori materials serve as a curriculum so that while each child is exercising his or her free choice, the child is in a highly structured environment. As a general matter, teachers provide lessons on each set of work, and children engage with the materials/work in a way that is specific to the particular lesson. For example, for table washing or flower arranging lessons in the 3-to 6-year-old classroom, there is a precise routine and ordered sequence with which children engage in the lesson. All the materials for the work are carefully laid out in deliberate fashion (usually on student eye-level, within reach). This approach is consistent with the human development literature showing the importance of routines, sequencing, and predictability for all students (Lillard, 2017).

For younger children, the prepared environment focuses on sensory-refinement: teaching students to recognize differences in sensory input across many dimensions—length, height, depth, weight, hardness/softness, roughness/smoothness, tone, pitch, saltiness, bitterness, sweetness, etc. For elementary-school age children, a prepared environment involves sparking interest in the broader world through the introduction of five “great lessons”: the creation of the universe and earth; the development of life—animals and plants; the development of human beings; the development of symbolic communication and language; and the development of mathematics—and then giving children broad latitude to research things that interest them that are sparked by those lessons. As children age, the prepared environment is...
extended beyond the classroom—to include the resources of libraries, museums, universities, and the broader community.

Whereas traditional classrooms for young children are often colorfully decorated with bulletin boards, student work, and posters, recent studies demonstrate the potential for such visual overstimulation to distract young children (Fisher et al., 2014). Students perform at higher levels on tests of cognitive processes in environments that are not crowded or noisy. The ideal learning environment is quiet, roomy, and spatially ordered (Lillard, 2017).

**Mindfulness**

Mindfulness is inherent in the Montessori method (Lillard, 2011; Stephenson, 2017). Wildflower Schools have intentionally incorporated mindfulness training into their work with both adults and students. A growing research base suggests that mindfulness training supports emotional well-being and resilience in young children. Recent studies have shown that early mindfulness training can have longer-term outcomes on a host of wellness factors (Broderick and Metz, 2009).

**Beautiful Classroom Design**

Montessori wrote about the importance of a classroom that is marked by order, quiet, and simplicity. The founding Wildflower team sought to expand and deepen Montessori’s emphasis on beauty. As a result, Wildflower Schools are particularly focused on the importance of physical and environmental beauty in design, color, and furnishing. Wildflower’s emphasis on beauty draws on larger studies in the field of architecture and design showing the importance of attractive learning environments on learning outcomes (Rudd et al., 2008).

**Integration with the Natural World**

Montessori schools cultivate each child’s direct relationship with the natural world. Students take excursions into nature and bring nature into the classroom so that they learn to care for the environment. Decorating classrooms with plants, trees, animals, and other elements of nature also contributes to the creation of a beautiful classroom. Whereas traditional Montessori classrooms typically have small plants throughout the classroom environment, Wildflower schools dedicate substantial portions of their space to plant life so that children can be immersed in the natural world even in urban environments.

At Wildflower, all children go outside every day, regardless of the weather. This commitment stands in marked contrast to traditional models of education where inclement weather often leads to cancelled recess. The merits of bringing students into nature are well-known among practitioners and experiential educators. Berman et al. (2008) have demonstrated the cognitive benefits of interacting with nature. Kaplan and Kaplan (1989) describe the type of attention that individuals experience when quietly hiking in the woods or watching a sunset on a lake as “soft fascination.” They note that this type of attention does not require an active, intentional focus and allows for free flowing thoughts. “Soft fascination may be a mixture of fascination and pleasure such that any lack of clarity an individual may be experiencing is not necessarily blotted out by distraction, but rendered substantially less painful” (Kaplan and Kaplan, 1989).
Intentional Diversity and Inclusion Among Students and Teachers

Wildflower schools focus on building intentionally diverse communities of both families and teachers and commit to welcoming everyone into the community on equitable terms. Wildflower classrooms are intended to serve as a model for the way harmony and diversity can coexist, with the hope that students might carry into the wider world an appreciation for diversity and the skills of collaboration and conflict resolution developed in school.

Sociologist Amy Stuart Wells has demonstrated the positive gains for all students when they learn in intentionally diverse classrooms (Stuart Wells et al., 2016). Specifically, students demonstrate greater levels of innovation, greater diligence in defending their ideas, and even expanded cognitive development in more diverse settings. Similar impact has been found for adults in diverse work settings (Phillips, 2014; Gurin et al., 2002).

Equity and Social Justice

Wildflower views learning in an environment marked by intentional diversity as an essential component of preparing to live in a pluralistic, diverse society. Transcending our society’s history of oppression and injustice, however, requires that we also teach justice explicitly. Dr. Montessori articulated the importance of facing up to history in this way:

Human history teaches us that peace means the forcible submission of the conquered to domination once the invader has consolidated his victory, the loss of everything the vanquished hold dear, and the end of their enjoyment of the fruits of their labour. The vanquished are forced to make sacrifices, as if they are the only ones guilty and merit punishment simply because they have been defeated. Meanwhile, the victors flaunt the rights they feel they have won over the defeated populace, who remain victims of disaster. Such conditions may mark the end of actual combat, but they certainly cannot be called peace. The real moral scourge that stems in every people on earth is marked by one wave after another of such triumphs and such forms of injustice, as long as such profound misunderstanding continues to exist, peace will definitely fail to fall within the range of human possibilities.

-Maria Montessori, Education and Peace

The fact is that if you want to build teams or organizations capable of innovating, you need diversity. Diversity enhances creativity. It encourages the search for novel information and perspectives, leading to better decision making and problem solving. Even simply being exposed to diversity can change the way you think. This is not just wishful thinking: it is the conclusion I draw from decades of research from organizational scientists, psychologists, sociologists, economists and demographers.

-Katherine Phillips, Columbia Business School

Wildflower seeks to bring an awareness of injustice to all aspects of the school model in order to develop the capacity in both adults and children for a just peace. This includes putting substantial effort into racial identity development for staff, offering an intentional curriculum in racial identity development for children, reviewing all materials in all subjects for bias and inaccuracy, and teaching critical consciousness skills to children starting at a young age (Dee and Penner, 2016; Ladson-Billings, 1995).
Open Questions

We invite colleagues to engage with us on the following key research questions:

1. Each of the components of Wildflower’s enriched environment is compatible with the Montessori approach. Non-Wildflower Montessori schools frequently demonstrate one or more of these design elements as well. Can research on the variation along these dimensions across Montessori schools shed light on the value of these enrichments?

2. The Wildflower team often hears that one impediment to scaling Montessori classrooms is the cost of such beautiful, prepared environments with specialized materials. How does the team address cost concerns with regard to scale? How does the Wildflower team ensure that the enriched environments are protected as the organization scales and expands?

3. Educators, parents, and students understand the impact of a beautiful classroom design that incorporates elements of nature. How might the research community partner to more fully understand the relationship between a child’s environment and their learning?

4. What challenges exist in diverse-by-design learning environments? What steps can Wildflower take to mitigate the downside of such an approach?
Connecting School, Home, and Community

Family Involvement and Family Education
Wildflower encourages alignment between the home and school environments, and one of its nine principles commits to partnering with parents and families; valuing their wisdom, inviting their engagement, and enthusiastically sharing Montessori methods. Similarly, parents at Wildflower schools are encouraged to see their roles as active supporters of the schools and of teacher-leaders.

Wildflower schools realize the connection between home and school through a variety of practices, such as:

1. **Active Classroom Roles.** Parent roles vary depending on the age of children served by a school as younger children have a harder time with parents visiting classrooms than do older children. Parents and family members play a diverse set of roles such as cooking a meal with the class, teaching a foreign language, or chaperoning children on a “going out”—a child-planned research project that brings students into the community.

2. **Home Visits.** Some teachers begin their relationship with each child in a variety of ways, including meeting with families in their homes before the school year begins.

3. **Parent Workshops.** Wildflower Schools frequently hold events on child development research and Montessori methods to build parents’ understanding of the development of their children. Wildflower also leads discussions on issues of equity, diversity, and identity.

4. **Continuous Communication.** Teachers regularly communicate with parents in writing or by phone.

In 2002, Henderson and Mapp collected several decades’ worth of findings related to the impact of parent involvement on student outcomes. Their meta-analysis showed a consistent improvement in a child’s academic outcomes when a parent is involved in school. Regardless of family income or background, students whose parents are involved in their schooling are more likely to attain higher grades and test scores, attend school regularly, demonstrate better social skills, show improved behavior, and adapt well to school. Another important finding suggests that all students in a school benefit when a parent becomes involved. (Henderson and Mapp, 2002). It is important to note that the Henderson and Mapp’s meta-analysis included a variety of methods of involvement that were each counted equally. There is a substantive difference between a parent checking his or her child’s homework and a parent engaging in a sustained relationship with a teacher. More research is needed to understand more fully what types of parent engagement are most powerful.
Embedded in Community
A subtle, yet significant, difference between a Wildflower school and a traditional school is the view of school vis-à-vis the adult world. Wildflower (and Montessori more generally) views education as part of life as well as preparation for life. Wildflower operationalizes this view by breaking down the institutional barriers that separate and insulate schools from the broader world. For example, the shopfront settings provide a visual reminder that children are a part of community life—going about their business each day as adults do. Second, Wildflower schools rely on the community for services that would ordinarily be located onsite in a traditional school setting. As one example, most schools rely on public parks for their playgrounds, and so schools are typically located within a short walk from public parks. As Wildflower expands to new states and cities, this requirement has been modified. In some jurisdictions, schools must offer their own outdoor space, onsite.

The interaction between Wildflower schools and their local environment is bidirectional. Students and their families benefit from being integrated into the daily life of the adult world and, in turn, the local community and civic institutions benefit from greater use by school children and their families.

In his 1977 book, professor of architecture Christopher Alexander introduced a theory of design that relies on a set of interconnected patterns (a “pattern language”) to build a community for maximal authenticity, enjoyment, and function. Alexander advocated for an organic and biological, rather than an industrial, conception of design and growth. In a city based on interconnected patterns, schools would be situated in small “shopfront settings.” A shopfront serves the students by allowing children to feel more connected to their community of origin and can spur growth and development in the surrounding neighborhood (Alexander, 1977).

This final component of the Wildflower school model is the most aspirational: the organization hopes to establish clusters of at least three to four schools in each community. Each cluster or “hub” will strengthen and revitalize its surrounding neighborhood.

There have been several efforts through federal grant initiatives and other programs to develop communities and schools in tandem (EPA, 2003). What makes Wildflower Schools different is that, by design, Wildflower teams rely on elements of the community for core educational functions mandated by regulation such as food preparation, physical education, and arts education. This transforms community partnerships from nice-to-have programs to core aspects of the educational experience. Wildflower is eager to test its hypothesis that the schools will have a positive and accelerating effect on the surrounding community.

Open Questions
We invite colleagues to engage with us on the following key research questions:

1. Maria Montessori was clear that parents should not work in the classroom alongside trained teachers. She was concerned that too many adults would lead to an environment with too much control over children. More recent research demonstrates the positive outcomes associated with parent involvement. What types of parent involvement enhance children’s development in Montessori environments? What steps can schools take to minimize any risks related to parent involvement?

2. Wildflower hypothesizes that the storefront approach, one that is connected to the life of a community, will benefit both the students and the surrounding communities. How do we set up a study to test this bold hypothesis?

3. How can Wildflower be sensitive to various cultural norms of different neighborhoods and communities? How can Wildflower’s goal of uplifting communities remain sensitive to such norms?

4. How does the relationship between a Wildflower school and its community evolve as the number of schools in each cluster expands?

Justice-Oriented Engagement with the Community
Wildflower’s intention is not only to partner with surrounding communities but also to work actively to address the racism, discrimination, poverty, and other injustices that are the lived reality of our students and neighbors.
A New Organizational Structure

Perhaps the most radical aspect of the Wildflower School model is its organizational approach. The organization turns upside down the idea of a large school system, governed by administrators who are far away from students. The primary hypothesis shaping Wildflower’s organizational approach is that teacher-leaders are more effective at making important school administrative decisions than others who may have more administrative experience but are several organizational layers removed from the classroom in large school systems. The following core components are hallmarks of Wildflower’s organizational design:

- Teacher leadership
- Small school size
- Organizational model: A teal organization

Teacher Leadership
At Wildflower, teachers are responsible for both teaching and administrative roles. Two to four teachers work together in a non-hierarchical, co-leadership model. Wildflower teacher-leaders are partners and social entrepreneurs, responsible primarily to themselves and to each other for every aspect of their school and its overall success. By operating on a small scale, teacher-leaders are able to make day-to-day decisions that respond to the needs of the children and school-wide decisions that express their own vision in the context of the needs of children, families, and themselves and the community they are serving. When individual teacher-leaders request particular needs, the Wildflower Foundation is available for professional support, provision of tools, and additional resources, when possible.

Research from organizational psychology suggests that employee input into decisions governing the workplace leads to greater job satisfaction and “drive” (Pink, 2011). Promising new research from other fields, such as medicine, shows the importance of practitioner-driven leadership (Goodall, 2011; Darzi, 2009).

While teacher leadership may be defined broadly, there is significant research evidence that schools that provide opportunities for teacher leadership have more collaborative cultures and are more successful at spreading best practices and encouraging teacher professional learning (Curtis, 2013; Muijs & Harris, 2003, 2006). Existing research on teacher leadership has taken place in traditional schools where teachers are charged with leadership duties in an existing hierarchical structure. Additional research is needed on the impact of teacher leadership in environments such as Wildflower where only two or more teachers work in the absence of any administrators.

Wildflower’s practice of classroom co-leadership is one area in which its model differs from common Montessori practice. Co-leadership is particularly important at Wildflower for reasons that are connected to the rest of its model. From an organizational perspective, co-teachers allow for a level of continuity and a pipeline for sustainability in the case that a teacher leaves. From a substantive perspective, the co-teachers model a purely non-hierarchical approach to leadership in line with Wildflower’s overall working approach. To address the risks associated with co-leadership, Wildflower has collaborated with leading Montessori coaches and experts to develop specific techniques such as taking turns in the lead guide role and careful documentation of student activities. It is worth noting that the co-teaching model is common in special education settings (Murawski, 2001). Some early research in the special education literature points to which
types of co-teaching models lead to greatest student success, although additional research is warranted.

Serving as a teacher in a Wildflower school is clearly a different role from most teaching roles, and it raises the question of whether a sufficient number of teachers are qualified and interested in such a role. Wildflower’s work to date suggests that the teacher-leader role attracts educators who are interested in greater autonomy, accountability, and professional growth but do not want to leave the classroom to become full-time administrators. Early anecdotal evidence suggests that many educators are interested in such working conditions.

Small School Size
Wildflower schools typically serve 25 to 30 students per school. School size has historically been a topic of great interest among education reformers. Early research has shown some benefits of smaller schools in the traditional system, especially with regards to changes in college-going behaviors among disadvantaged students (MDRC, 2013). The small schools movement, however, is not entirely relevant to Wildflower because the size of small schools is generally still much larger than a typical Wildflower school. In addition, small schools still operate within a more traditional pedagogical approach making research findings less relevant to Wildflower.

Despite an in-depth body of research on class size, most of the studies have been conducted in traditional educational environments, with little relevance to the Wildflower approach. Advocating for smaller class sizes is a popular position in mainstream educational circles, yet it may not be as relevant in a Montessori context. Maria Montessori experimented with different sizes and argued that 25 to 40 students per class is the ideal size. She was concerned that a lower adult:child ratio might risk too much adult control and not allow for the peer-to-peer learning and collaboration possible in larger classrooms.

A more relevant research base may be found in the literature on the homeschooling movement as homeschoolers currently number over 1.8 million students in the United States. Many homeschooling students meet in small groups or co-ops, approximating the size of Wildflower schools. In a meta-analysis, Ray (2017) found that a majority of studies on academic achievement demonstrate a positive effect for the homeschooled students compared to traditional-schooled students, while a few studies show mixed or negative results. A majority of studies also show clearly positive outcomes in the realm of social-emotional development for the homeschooled students compared to those in traditional schools (Ray, 2017).
Organization Model: A Teal Organization

In *Reinventing Organizations* (Laloux, 2014), Frederic Laloux provides a rationale for many of the foundational ideas behind the Wildflower organizational model. In particular, Laloux introduces the notion of organizational development as evolutionary. He argues that current organizations are limited in their effectiveness because they are hierarchical, resistant to new ideas, and do not incorporate the entirety or “wholeness” of their employees. Laloux advocates for a Teal organization, where self-management replaces a hierarchical, pyramid-like structure and where individuals bring their whole selves to the endeavor. As a decentralized network where teacher-leaders have autonomy, Wildflower embraces the notion of a Teal organization and seeks to emulate its ideals.

The Wildflower Foundation intends to support teachers and families working to create Wildflower schools wherever such initiatives emerge, and thus envisions substantial growth over time. The model is designed to exist in any governance structure, whether a traditional public school, charter school, or independent school. As the organization grows, it benefits from an expanding community of learners and professionals working together as well as from the economic efficiencies that can arise from sharing resources. At the same time, each Wildflower team focuses on protecting the autonomy of every teacher-leader and resisting the expansion of central administration and authority. Each school is as a node in a network, with substantial freedom in school-level decision-making and access to the resources of the network when those resources are useful and compelling to the school. Reciprocally, each school is also accountable to its neighbor schools and the broader Wildflower community, and is responsible for supporting existing and future Wildflower schools. Finally, wherever possible, the team make its materials, software, and learning available publicly, so that all schools can benefit from them, whether or not they are affiliated with the Wildflower network.

The bold organizational theory underlying the Wildflower model poses some interesting research hypotheses. The team is actively cultivating research partners to help better understand the impact of our unique organizational structure on teachers, students, and their families.

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Evolutionary Breakthroughs in Human Collaboration

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<tr>
<th>Color</th>
<th>Description</th>
<th>Metaphor</th>
<th>Key Breakthroughs</th>
<th>Current Examples</th>
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| RED   | Constant exercise of power by chief to keep foot soldiers in line. Highly reactive, short-term focus. Thrives in chaotic environments. | Wolf pack | - Division of labor  
- Command authority | - Organized crime  
- Street gangs  
- Tribal militias |
| AMBER | Highly formal roles within an hierarchical pyramid. Top-down command and control. Future is repetition of the past. | Army | - Formal roles (stable and scalable hierarchies)  
- Stable, replicable processes (long-term perspectives) | - Catholic Church  
- Military  
- Most government organizations (public school systems, police departments) |
| ORANGE | Goal is to beat competition; achieve profit and growth. Management by objectives (command and control over what, freedom over how). | Machine | - Innovation  
- Accountability  
- Meritocracy | - Multinational companies  
- Investment banks  
- Charter schools |
| GREEN | Focus on culture and empowerment to boost employee motivation stakeholders replace shareholders as primary purpose. | Family | - Empowerment  
- Egalitarian management  
- Stakeholder model | Businesses known for idealistic practices (Ben & Jerry’s, Southwest Airlines, Starbucks, Zappos) |
| TEAL  | Self-management replaces hierarchical pyramid. Organizations are seen as living entities, oriented toward realizing their potential. | Living organism | - Self-management  
- Wholeness  
- Evolutionary purpose | A few pioneering organizations (see “Examples of Teal Managements”) |

(Laloux, 2014)
Open Questions

We invite colleagues to engage with us on the following key research questions:

1. Does the co-teaching model lead to greater stability and retention in the teacher workforce compared to a more hierarchical model with a lead teacher and assistant teacher? What are the differences in terms of student outcomes, teacher outcomes, and classroom environment?

2. Do the drawbacks that Montessori feared (more adult control of classroom, less child leadership and independence, less teacher knowledge of key classroom information) play out in a Montessori environment led by two co-teachers?

3. How should Wildflower design a study to test its organizational hypotheses and the application of Laloux to the school model?

4. The intent of the Wildflower model is to be agnostic to governance structure. How might we better understand the impact of governance structure, if any, on the school model and on student outcomes?
Conclusion

In *Tinkering Towards Utopia* (1995), educational historians David Tyack and Larry Cuban suggest that the reason why major education reforms of the past century have failed is because they try to transform an entrenched system. The only reforms that have “stuck” are those that tinker at the margins such as age-graded classrooms, SMART boards, and other small new technologies. Yet, according to Tyack and Cuban, the core elements of the traditional industrial-age school system have proven nearly impossible to change. At the end of the day, individual teachers are brilliant at closing the door on larger-scale reforms and doing as they please within the walls of their own classrooms.

Wildflower Schools do not “tinker around the edges.” Instead, the organization proposes a radically new vision of an environment where all children can thrive and all educators can lead. Such a vision is supported by both a 100 year-old Montessori tradition as well as by a substantial body of evidence from human development, learning science, organizational theory, urban design, and other fields.

If Tyack and Cuban are correct in their analysis, then Wildflower Schools is the rare sort of endeavor that would have the potential to impact the larger education system because the schools involve teacher leadership and decision-making in the absence of any layers of administration. The Wildflower team is optimistic that the model will lead to great satisfaction among teachers and that families, in turn, will demand more of such schools.

In order to serve additional families and communities, Wildflower is seeking partners in the research, policy, and philanthropy community to help think through some of the outstanding questions detailed above. The team looks forward to developing such close partnerships in order to better serve Wildflower’s students, families, and communities.
Bibliography


