

[played](#)". Rabindranath Tagore, the [Nobel-Prize-winning](#) poet, [set up a network](#) of Montessori schools to free children's [creative self-expression](#).

But does the method actually work?

It is more than a century since the Italian doctor and educator Maria Montessori designed her famous principles, which encouraged children to develop autonomy from a young age. Her life offers an inspiring story of an early feminist who dared to defy the Fascist regime in the pursuit of her dream. And according to some estimates, there are now at least [60,000 schools across the world](#) using the Montessori method.

Remarkably, however, the benefits of a Montessori education remain a matter of debate. This is partly due to the inherent difficulties of conducting scientific research in the classroom, meaning that the existing studies have been subject to severe criticism by sceptics. It is only recently that researchers have been able to resolve some these issues, and their conclusions make intriguing reading for teachers, parents, students – and indeed anyone who is fascinated by the malleability of the infant mind.

Playing with breadcrumbs

Montessori was born in the small Italian municipality of Chiaravalle in 1870 to progressive parents, who frequently mingled with the country's leading thinkers and scholars. This enlightened family environment provided Montessori with many advantages over other young girls of the time.

"Her mother's support was vital for some important decisions, such as her enrolment in a technical school after her elementary education," says Elide Taviani, a member of the board of directors of the Opera Nazionale Montessori in Rome, Italy – the organisation founded by Montessori to research and promote her educational methods. Her parents' support also proved to be essential for her decision to study medicine, a field that was dominated by men.

"Maria Montessori's family were always extremely sensitive to social issues," adds Taviani, such as the fight for female emancipation – a battle that Montessori would continue into adulthood. "She represented an important reference point for other women of the era."



Children are encouraged to complete activities with as little adult interference as possible (Credit: Davies/Topical Press Agency/Getty Images)

Family Tree

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Soon after graduating, in 1896, Montessori began work as a voluntary assistant in a psychiatric clinic at the University of Rome, where she cared for children with learning difficulties. The rooms were bare, with just a few pieces of furniture. One day, she found that the children were enthusiastically playing with breadcrumbs that had dropped on the floor, says Catherine L'Ecuyer, a researcher in psychology and education at the University of Navarra in Spain and author of *The Wonder Approach*. "It then occurred to her that the origin of some intellectual disabilities could be related with impoverishment." With the right learning materials, these and other young minds could be nurtured, Montessori concluded.

The observation would lead Montessori to develop a new method of education that focused on providing the optimum stimulation during the sensitive periods of childhood.

At its centre was the principle that all the learning materials should be child-sized and designed to appeal to all the senses. In addition, each child should also be allowed to move and act freely, and use their creativity and problem-solving skills. Teachers took the role of guides, supporting the children without coercion or control.

Montessori opened her first "Casa dei Bambini" – "Children's House" – in 1907, and it soon spawned many others. Over time, she also forged connections with visionaries around the world, including Gandhi. Perhaps surprisingly, when the Fascists first came into power in Italy in 1922, they initially embraced her movement. But they soon came to oppose the emphasis on the children's freedom of expression. According to Taviani, Montessori's values had always been about human respect, and "the rights of children and women. But the Fascists wanted to exploit her work and her fame."

Things reached a breaking point when the Fascist regime tried to influence the schools' educational content, and in 1934 Montessori and her son decided leave Italy. She would only return to her homeland in 1947, and she continued to write about and develop her method until her death in 1952, at the age of 81.

Children in charge

Today there are many different kinds of Montessori schools, not all of which are recognised by Opera Montessori, but certain fundamental principles have remained intact. One is the idea of teachers as gentle guides, encouraging the children to complete the activities with as little adult interference as possible.

"Our children learn to self-manage," says Miriam Ferro, the headteacher of the Ecoscuola Montessori in Palermo, Sicily, which welcomes children from their first few months up to the age of six.

Some subjects at Ecoscuola are similar to those taught in other pre-schools and schools, such as mathematics and music. But there is also a segment called "practical life" that goes right back to Montessori's original vision of children's autonomy. It involves real-life practical tasks, such as serving drinks to their classmates. For safety, teachers would take charge of boiling the water, but the children would play active roles in cleaning the work surface and then presenting the drinks to others. "And during breakfast and lunch they are also self-directed, taking it in turn to lay the table and serve their classmates," says Ferro.



Maria Montessori developed a new method of education that appeals to children's senses, encouraging them to use their creativity and problem-solving skills (Credit: Alamy)

The method encourages independence, but also, collaboration. Children of different ages are taught in the same classroom, so that the six-year-olds, for example, can help the three-year-olds. There are no tests or grades, to avoid competition between pupils. Each session is three hours long, to allow the children to immerse themselves in what they are doing. The learning materials are designed for being handled and explored with all the senses, such as letters and numbers made of sandpaper, which the child can trace with their finger.

As cheerful and sensible as this concept may sound, does it bring about any tangible benefits, beyond those seen in a typical classroom?

It may seem like a simple question, but it's very hard to answer. Research suggests there may be benefits to specific aspects of a Montessori education – but the results come with important caveats. That's because the standard scientific process used to find out if something works or not, is difficult to apply to the classroom.

To measure the effects of an intervention scientifically, you would typically conduct a randomised controlled trial. This involves randomly allocating the participants into two groups – the "experimental" group who are given the intervention, and the "control" group who undergo a comparable, but different, procedure that is not expected to have the desired effect. If those who received the intervention did better than those who did not, you can conclude that it has worked as desired. In medicine, the people in the intervention group might receive a real tablet, while the control group might receive a 'placebo' pill that looks just like the real thing, but does not contain the active ingredients.

Unfortunately, it is very hard to apply the same rigour to the testing of educational interventions. You might decide to compare pupils in Montessori schools to those in some other educational system. But many Montessori schools are fee-paying, and the parents' choice may be related to many other confounding factors that could also influence a child's progress. It's not just the parents' wealth that matters. "Parents sending their children to a Montessori school may be more engaged in their education, so their own educative style at home may positively influence their success," explains Javier Bernacer at the Institute for Culture and Society, University of Navarra in Spain.

Children who went to a Montessori school tended to have better literacy, numeracy – and story-telling skills

Certainly, some studies had appeared to demonstrate [a range of benefits for children's development](#), but we can't be sure if it's a result of the Montessori method or whether it's simply due to their privileged background.

Angeline Lillard, a professor of psychology at the University of Virginia in Charlottesville, has attempted to overcome these issues by looking at a particular Montessori School in Milwaukee, the US. Children who applied for the school were selected through a lottery system. This random selection should eliminate those other confounding factors – allowing Lillard to be more confident that any differences were down to the Montessori method itself. Analysing [their progress at age five](#), Lillard found that the children who went to the Montessori school tended to have better literacy, numeracy, executive function and social skills, compared to those who had attended the other schools. And at age 12, they showed better story-telling abilities.

As positive as these results are, it's worth noting that this was based relatively small sample of pupils. Chloe Marshall at the University College of London Institute of Education says that Lillard's results provide the most rigorous test yet, "but it's just one piece of evidence, and we need replication in science".

The benefits of "unstructured time"

Looking at the education and psychology literature more generally, however, Marshall suspects that the method does bring some benefits, without any downsides. For example, there is [some recent evidence](#) that providing children with unstructured time, in which they are allowed to get on with their own activities without too much interference from an adult, does lead to greater independence and self-direction – and this approach is at the very heart of the Montessori method.

There is also some evidence that children in classrooms that only use the verified Montessori learning materials perform better than classrooms with other kinds of educational objects – suggesting that their unique design does benefit early learning.

Solange Denervaud, a neuroscientist at the Centre Hospitalier Universitaire Vaudois in Switzerland and a former Montessori teacher herself, is similarly positive. In a [recent study](#) she

found that children who attend Montessori schools tend to have greater creativity, which, in turn, seemed to be linked to better academic outcomes. (Although she was unable to obtain a fully randomised sample of pupils, she tried to make sure that she was comparing children of similar intelligence and socioeconomic backgrounds in an attempt to eliminate some of the confounding factors.)



Maria Montessori believed that with the right learning materials, young minds can be nurtured (Credit: Corbis/Getty Images)

Denervaud suspects that the advantages derive from the children's experience of taking the lead on their learning activities from a young age, and the increased opportunity to find their own solutions to a problem and to learn from their mistakes – all of which should encourage more flexible thinking. "It's a safe space to do trial and error," she suggests.

Might the success of Montessori alumni reflect these benefits? Marshall says we need to reserve judgement, since we don't yet have convincing evidence on the long-term benefits. Denervaud is more positive: given her results, she believes that Montessori education could help people to get ahead in creative industries.

"When you're at school, you're building the architecture of your mind," she says. It would make sense that people who have learnt to be self-motivated, flexible, and cooperative at a young age should have an advantage later in life, she says.

The Montessori brand

Whatever the true benefits of the method, there is certainly something appealing about the central idea – and its proponents have made a huge success of marketing its message of a liberated, self-directed childhood free from the tyranny of conventional education. Maria Montessori was tireless in the promotion of her method and her successors have continued spreading the world.

"It has become, not by accident, a 'brand'," explains Gianfranco Marrone, a professor of semiotics, the study of signs and symbols, at the University of Palermo. He points to the rise of brands and marketing since the 1980s, which extends to educational institutions. The name Montessori, he suggests, is now associated with a high quality of education, and even a life philosophy, that has attracted many parents.

When you're at school, you're building the architecture of your mind - Solange Denervaud

Ironically, however, many schools today bear Maria Montessori's name while only loosely adhering to her methods. This is because the word is not trademarked. While there are official Montessori institutions in different countries providing teacher training and accreditation, this is not necessary for schools to use the term in their advertising.

"It is increasingly difficult to find authentic Montessori education," says L'Ecuyer, who worries that some schools may simply be following a trend, without truly embracing the principles regarding child autonomy, or the length of the learning sessions – all of which could influence important outcomes. The lack of consistency in applying the method may explain why there is variability in measures of the Montessori method's benefits, including some failures to note any advantages over other educational systems.

Marshall is more sanguine about these changes. While she agrees that the diverse approaches can sometimes skew assessments of the Montessori method, she also recognises that the movement may need to adapt to social and technological change. Take electronic devices, and their many uses in education: "That's not something she could have written about."

It's a testament to Montessori's work that, more than 100 years after she opened her first school, educators are still wrestling with her theory, and that it is continuing to inspire serious research. And given the enticing recent results, it may continue to fire conversations for another century.

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