

FROM HUMAN CAPITAL TO HUMAN DEVELOPMENT: THE TRANSFORMATIVE POTENTIAL OF MONTESSORI EDUCATION

Stefano SCIPPO, Ph.D.,
University of Tuscia, Viterbo, Italy
stefano.scippo@unitus.it

Abstract: *This paper explores the potential of Montessori education to contribute to a transition from the dominant human capital paradigm to a human development perspective, as conceptualised by Amartya Sen. Drawing on the work of Maria Montessori, it argues that true social defence does not rely on weaponry or economic productivity, but rather on forming individuals capable of living freely and harmoniously with others. Montessori's vision, which prioritises autonomy, empathy, and social cohesion, resonates with contemporary calls for education that fosters not only cognitive skills but also human dignity and interdependence.*

While empirical studies confirm that Montessori students perform equally or better in academic assessments, this alone is insufficient. The true promise of Montessori education lies in its potential to cultivate reflective, socially responsible individuals. However, such potential is contingent upon faithful implementation of Montessori principles. Based on recent research from different countries, the article highlights structural and cultural obstacles to high-fidelity implementation, especially in public education systems.

The paper concludes that quantitative growth of Montessori schools must be accompanied by qualitative improvement to truly impact social cohesion and peace-building. Educational reform is thus essential—not only to safeguard the Montessori legacy, but to make education a tool for human flourishing.

Keywords: *educational effectiveness; human development; Montessori method; peace education; social development;*

Defence and human development

Since March 2025, there has been increasing discussion among European states about rearming as a means of ensuring their defence through deterrence. On this matter, Maria Montessori wrote very clearly back in 1949:

The issue of peace and war does not centre on the need to materially arm the people and strongly defend national borders. The “true frontier of defence against war” is man himself, and where man is socially disorganised and devalued, the universal enemy gains ground. (Montessori, 1949a, p. XV)

But what did Montessori mean by “socially disorganised”? In the same text, she explained:

Today, there exists only an “organisation of things”, not of people; only the environment is organised. Technical progress has set in motion a formidable mechanism that drags individuals along, drawn like dust to a magnet. This applies as much to workers as to intellectuals. All live in isolation from one another, focused on securing their material survival, drawn into the gears of a mechanised and bureaucratised world. [...] Humanity must be organised, because the frontier vulnerable to breach—through which war enters—is not the material border of nations, but the unpreparedness of man and the isolation of the individual. (Montessori, 1949a, pp. XXII–XXIII)

Montessori contrasted an “organisation of things” with an “organisation of humanity”. Today, in similar terms, we may oppose two socio-economic paradigms: the human capital model and the human development model (Mehrotra, 2005). The former treats education and health as investments aimed at increasing individual economic productivity and, by extension, GDP growth. In this view, a person’s value lies in their market contribution.

The human development paradigm, on the other hand—promoted by the UN and Amartya Sen (1999)—regards education and health as fundamental rights and ends in themselves. Its goal is to expand people’s freedoms and opportunities, improving collective well-being beyond mere economic gain (Baldacci, 2014).

Montessori education aims—albeit slowly—for a shift from the organisation of things to the organisation of human beings, from the paradigm of human capital to that of human development.

The issue of peace cannot be seen merely in negative terms [...] as the absence of war or the non-violent resolution of conflicts between nations. Peace inherently contains the positive notion of constructive social reform. (Montessori, 1949a, pp. XI)

[...] This immense social task is the true “valorisation” of the human being—the realisation of the fullest development of their energies and the preparation for a different form of human coexistence. (Montessori, 1949a, pp. XIV)

We might then ask: how, and to what extent, does the implementation of Montessori education today contribute to this transformation?

The Potential Contribution of Montessori Education

The answer to how Montessori education contributes to peace and human development can be found in many of Dr Montessori's writings. From her earliest publications, she argued that education must transcend the mere transmission of knowledge, becoming instead an "aid to life" and to the realisation of human potential (Montessori, 1948, 1949b). In contrast to the human capital paradigm—which assesses a person's worth by their economic productivity—Montessori's approach places the child at the centre, as the "builder of humanity" and of civilisation, not as an empty vessel to be filled (Montessori, 1949b).

Montessori education aims to shift from an "organisation of things" to an "organisation of human beings", valuing children's freedom and independence (Montessori, 1947a, 1948, 1949b). It seeks to liberate them from constraints and misunderstanding, allowing for self-directed activity and trusting in their "inner teacher". This nurtures strong character and social competence, enabling constructive conflict resolution (Montessori, 1947a, 1949b).

Unlike traditional schooling, which may foster dependence and passivity, the Montessori environment promotes psychological wellbeing and intrinsic motivation through focused, autonomous work (Montessori, 1947a, 1947b, 1949a). The ultimate aim is the full development of personality, culminating in "spontaneous discipline" and social cohesion based on will, unity, and collaboration (Montessori, 1947b, 1949b, 2007).

Such cohesion arises because Montessori education cultivates innate energies present from birth. If placed in the right environment, children naturally build a "society of cohesion", prioritising the group's honour over individual gain—a natural gift that emerges only when obstacles to development are removed. Unlike traditional schooling, which may discourage cooperation, the Montessori method fosters mutual help as the root of human goodness and social harmony (Montessori, 1949b).

Finally, we must acknowledge the role of cosmic education. As Montessori (1947a/1991) wrote:

By cosmic education we mean a true preparation of the new generations to understand that humanity as a whole tends toward unity as a single organism. This idea should not be presented merely as a guiding ideal, but as a reality already in existence—though still in the process of becoming. The goal is not to incite cooperation among humans as if unity were something to be achieved, but to awaken an awareness of an existing condition that demands the conscious adaptation of human beings to the real state of affairs in which they already live (Montessori, 1991, p. 66).

Montessori education, therefore, seeks to make individuals aware—starting from childhood—of the deep reality of human interdependence

and solidarity that already exists at the material level. The task is not to create unity, but to reveal it.

Cosmic education in particular helps children realise how people keep each other alive through their work, demonstrating an intrinsic altruism that transcends the pursuit of economic gain. This becomes especially evident through the study of history, one of the disciplines of cosmic education. According to Montessori (1950), learning about the history of civilisation—highlighting the heroic deeds and sacrifices of those who contributed to progress—leads children to admire the nobility of altruism and the beauty of work done for the benefit of humanity, present and future.

This approach aims to form generations who are more aware of the intrinsic value of human beings, more open to dialogue, and better equipped to overcome isolation—thus contributing to authentic peace.

What Research Says About the Effectiveness of Montessori Education

To answer the second question—namely, to what extent the implementation of Montessori education supports the natural development of children, fosters a “cohesive society,” and contributes to the shift from an organisation of things (the human capital paradigm) to an organisation of people (the human development paradigm)—we can turn to the available research on the effectiveness of this educational approach.

Montessori education is currently implemented in around 16,000 schools across more than 150 countries (Debs et al., 2022). Two recent independent reviews (Demangeon et al., 2023; Randolph et al., 2023) summarised findings from over 30 studies conducted in various countries. They concluded that Montessori education leads to better academic outcomes than traditional schooling and, according to some studies, also improves cognitive, social, and motor skills, as well as creativity.

These reviews do not include a recent Italian study (Scippo, 2023c), significant because Montessori education originated in Italy and is primarily delivered in state-funded preschools and primary schools—unlike most other countries, where only 9% of Montessori schools are publicly funded (Debs et al., 2022). The Italian research shows that Montessori students perform equally or better in standardised tests at ages 13 and 15, even years after completing Montessori schooling, compared to peers from similar socio-economic backgrounds. They also scored higher on empathy tests (Scippo, 2023b).

Implementation fidelity varies across schools and classrooms. In cases where Montessori education closely adhered to the original model,

children in primary school performed slightly worse and with more varied results in mathematics—likely due to the freedom to follow personal interests rather than curriculum targets. However, by the end of lower secondary school, these students not only caught up but outperformed others, with more even score distributions. These students also demonstrated stronger problem-solving skills, self-esteem, and empathy, potentially explaining their later academic recovery.

What Research Does Not Tell Us About the Effectiveness of Montessori Education

As shown, research appears to demonstrate—fairly robustly—that Montessori schools are capable of producing young citizens with equal or even superior academic knowledge compared to traditional schools. However, evaluating the effectiveness of an educational approach primarily on the basis of students' performance in standardised academic tests means doing so within the framework of the human capital paradigm. The underlying reasoning is: they are better prepared, therefore they will be more productive. But is it enough to have more capable and productive individuals to transition from an organisation of things to an organisation of human beings? Certainly not. What is needed are people who are more aware that developing their unique selves—alongside others—is more important than economic growth or increases in GDP.

On this front, empirical research offers limited insight from an accountability perspective. When it comes to socio-emotional traits—such as social skills, empathy, and collaboration—the findings are more uncertain. International studies are not consistent. One review finds significant effects on social skills only in Asian contexts, with outcomes varying depending on study quality (Demangeon et al., 2023); the other reports small to moderate effects on creativity and social skills, but highlights the low quality of available evidence, particularly at the secondary level (Randolph et al., 2023).

Italian research, while promising, involved a limited sample of 13-year-olds from the Rome area and cannot be considered representative of the wider Montessori population, nor does it offer long-term findings.

Perhaps, as the English biologist and geneticist J.B.S. Haldane (1985) once noted in the 1930s, to prove the superiority of any new educational method, one would need to follow thousands of children over time to see which group produces, on average, better citizens (Haldane, 1985).

Demonstrating whether Montessori students become “better citizens” may well be an impossible task for empirical research.

The Question of Implementation

Empirical research provides not only outcome data but also insights into educational processes. To assess the extent to which Montessori education contributes to a shift from the human capital paradigm to that of human development, we can adopt a forward-looking perspective based on evidence concerning implementation processes. The idea is that the more closely the educational process in Montessori schools aligns with the founding principles of the approach, the more likely it is that such implementation is fostering the desired paradigm shift.

In recent years, several international studies have examined the fidelity of Montessori implementation, including work by Lillard (2012), Murray (2019), Murray et al. (2019), and Fleming et al. (2023) in the US; Chen (2021) in China; Van Niekerk et al. (2024) in South Africa; De Brouwer et al. (2024) in the Netherlands; and Scippo (2023a, 2023b, 2023c) in Italy.

These studies agree that implementation fidelity is a critical factor in understanding the outcomes of Montessori education and helps explain inconsistencies in effectiveness research. Fidelity refers to how closely a programme adheres to its original or ideal model (Lillard, 2012). High-fidelity implementations have been linked to improved outcomes in areas such as executive functions, reading, maths, vocabulary, and social problem-solving.

Key features of high-fidelity Montessori education include: mixed-age classrooms (typically in three-year groupings, e.g., ages 3–6), which support peer learning and social harmony; long, uninterrupted work periods (around three hours in the morning and two in the afternoon for older pupils), allowing for deep concentration; exclusive use of Montessori materials designed for hands-on learning and self-correction; and teachers trained in the Montessori method who act as facilitators and observers rather than direct instructors, often with a single lead teacher per class.

Nevertheless, the practical implementation of Montessori education varies considerably between schools—and sometimes even between classrooms. In the United States, a study conducted in South Carolina (Fleming et al., 2023) found that only 51% of public Montessori programmes operated with high fidelity. Adherence to the model is most consistent in terms of uninterrupted work periods and access to Montessori materials. However, the presence of mixed-age classrooms is less common. The study also revealed that schools attended

predominantly by Black, Hispanic, and low-income students tend to have lower levels of fidelity. A key challenge in the U.S. lies in the tension between the Montessori model and the broader educational accountability movement, which emphasises standardised testing—an approach often at odds with high-fidelity Montessori practice (Fleming et al., 2023).

In China, Chen's (2021) study noted significant growth in Montessori education, with high fidelity mainly observed in the use of mixed-age classrooms (present in 96.7% of cases). However, other aspects varied widely: most classrooms employed co-teaching (87.1%) rather than a single lead teacher, and in 74.8% of classrooms, afternoon work cycles were shortened or absent. These adjustments were often attributed to "localisation," aimed at adapting to Chinese cultural norms—such as collectivism—and national curricular requirements. Yet, such adaptations risk undermining the promotion of individual independence and social cohesion fostered by higher-fidelity practice (Chen, 2021).

In the Netherlands, Montessori education has historically taken a flexible and experimental form. Maria Montessori herself criticised the blending of her method with other pedagogies. Currently, high-fidelity implementation is not widespread. There is a strong commitment to allowing children to choose their activities, but the range of available activities does not always align with the original Montessori model (De Brouwer et al., 2024).

In South Africa, the study by Van Niekerk et al. (2024) revealed a marked gap between theory and practice. Teachers reported struggles with school leadership that did not understand Montessori principles, pressure from parents to introduce non-Montessori activities such as worksheets, and regulatory demands that led to the introduction of non-Montessori materials—all of which compromised the fidelity of implementation.

Research carried out in Italy (Scippo, 2023b, 2023c) is based on a questionnaire (Scippo, 2023a) administered to 329 primary school teachers—about one-third of the estimated total in the country. This tool collected valuable data on educational processes, specifically on how Montessori education is implemented in primary schools. The findings revealed significant variability.

Many teachers struggle to implement Montessori education in line with the original model, due to obstacles imposed by public school practices that "contaminate" Montessori settings or by structural limitations within the education system itself.

One major issue is the limited autonomy granted to children: only half of Montessori teachers reported that their pupils are free to choose their activities or go to the toilet without asking for permission. Another barrier is the fragmentation of the school day, often disrupted by mandatory subjects (e.g., English, religion, physical education), making it difficult to guarantee the three uninterrupted hours of self-directed or small-group work central to authentic Montessori practice. Further challenges include the pressure to assign differentiated marks—despite the original model rejecting numerical grading—and the difficulty in organising mixed-age classes. Only 5.8% of teachers reported having children of at least three different ages (e.g., 9, 10, and 11) in the same classroom (Scippo, 2023c).

In summary, while the adaptability of the Montessori method may contribute to its global longevity and expansion (Debs et al., 2022), these studies highlight the risk that excessive divergence from its core principles could undermine its educational effectiveness.

Conclusions

As shown through the analysis of Maria Montessori's writings, the education she envisioned could, at least in principle, contribute to a gradual shift from the human capital paradigm to the human development paradigm. It aims to foster the spontaneous emergence of a "society of cohesion" in which children practise social skills for the good of the group and develop an awareness of human interdependence.

However, empirical research on the effectiveness of Montessori implementation largely reports positive results only in academic achievement—not in social-emotional abilities such as empathy or collaboration. This is likely due to the fact that, despite its global reach and its status as the world's largest educational reform movement, with an estimated 16,000 schools as of 2022 (Debs et al., 2022), Montessori education is rarely implemented in full fidelity to its original model.

In the United States, accountability demands—including standardised testing and rigid curricula—conflict with the Montessori emphasis on child-centred, intrinsically motivated learning. Under-resourced schools, often attended by disadvantaged students, are more likely to have low-fidelity implementation (Fleming et al., 2023).

In China, "localisation" efforts have led to practices such as co-teaching, lower teacher-student ratios, and shortened work cycles, aimed at aligning with state directives and collectivist cultural norms, but at the cost of individual independence and social cohesion (Chen, 2021).

In the Netherlands, Montessori education balances between strict adherence and flexible adaptation. Schools often use single-age classes and incorporate non-Montessori activities, influenced in part by parental pressure for academic results (de Brouwer et al., 2024).

In Italy, only half of primary Montessori teachers apply practices aligned with the original model—particularly in personalised learning and freedom of activity choice. Multi-age classrooms are rare, and rigid public school timetables hinder the extended, uninterrupted work cycles that are fundamental to Montessori education (Scippo, 2023c).

It is perhaps unsurprising that in societies dominated by the human capital paradigm, an educational model aiming to promote a different vision—one that centres human development in harmony with others—struggles to find space.

Nevertheless, the existence of high-fidelity Montessori schools in every country studied shows that these barriers can be overcome. Achieving this requires strong collaboration among the entire school community: teachers, leadership, families, and support staff (Ceccacci et al., 2016). For such collaboration to become widespread, structural reforms are needed—reforms that would benefit not only Montessori schools, but education as a whole.

It is therefore clear that, if we wish for Montessori education to contribute to a slow and progressive shift from the human capital paradigm to that of human development, the question of implementation must be addressed. At the very least, it must be acknowledged and efforts made to promote authentically Montessori education—rather than simply being satisfied with the numerical growth of Montessori schools, as highlighted in several studies.

In the United States, for example, Fleming et al. (2023a) report that the number of public Montessori programmes rose from 550 to 570 between 2016 and 2023, marking a rapid shift from private to public provision. Fleming and Culclasure (2023) also note the expansion of Montessori schools in South Carolina.

In China, estimates of the number of schools vary widely, but Debs et al. (2022) estimate around 1,100 Montessori schools in 2022—a figure requiring ongoing monitoring, given the rapid evolution of China's educational landscape.

In Italy, the number of Montessori primary school sections grew from around 50 in 2016 to approximately 130 by 2025 (Scippo, 2022).

In short, the quantitative expansion of Montessori schools cannot, on its own, bring about meaningful change in the societies where it occurs unless it is accompanied by a qualitative improvement in the education

they offer—specifically, a concerted effort to ensure faithful implementation of the model envisioned by the Italian educator herself. In conclusion, Montessori education could help build a more peaceful world—if we have the courage to follow the path indicated by Montessori, paying close attention to implementing her original model. Then, Montessori schools could nurture generations of individuals who are not only better prepared, but above all, more deeply aware that the human being is a value in themselves, one that must develop freely and in harmony with others.

Such generations would surely be better equipped than ours to move from an organisation of things to an organisation of human beings, from a paradigm of human capital to one of human development. They would be more capable of dialogue across borders, of speaking to one another, and of reducing both the unpreparedness and the isolation of human beings when confronted with the enemy—that is, war.

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