

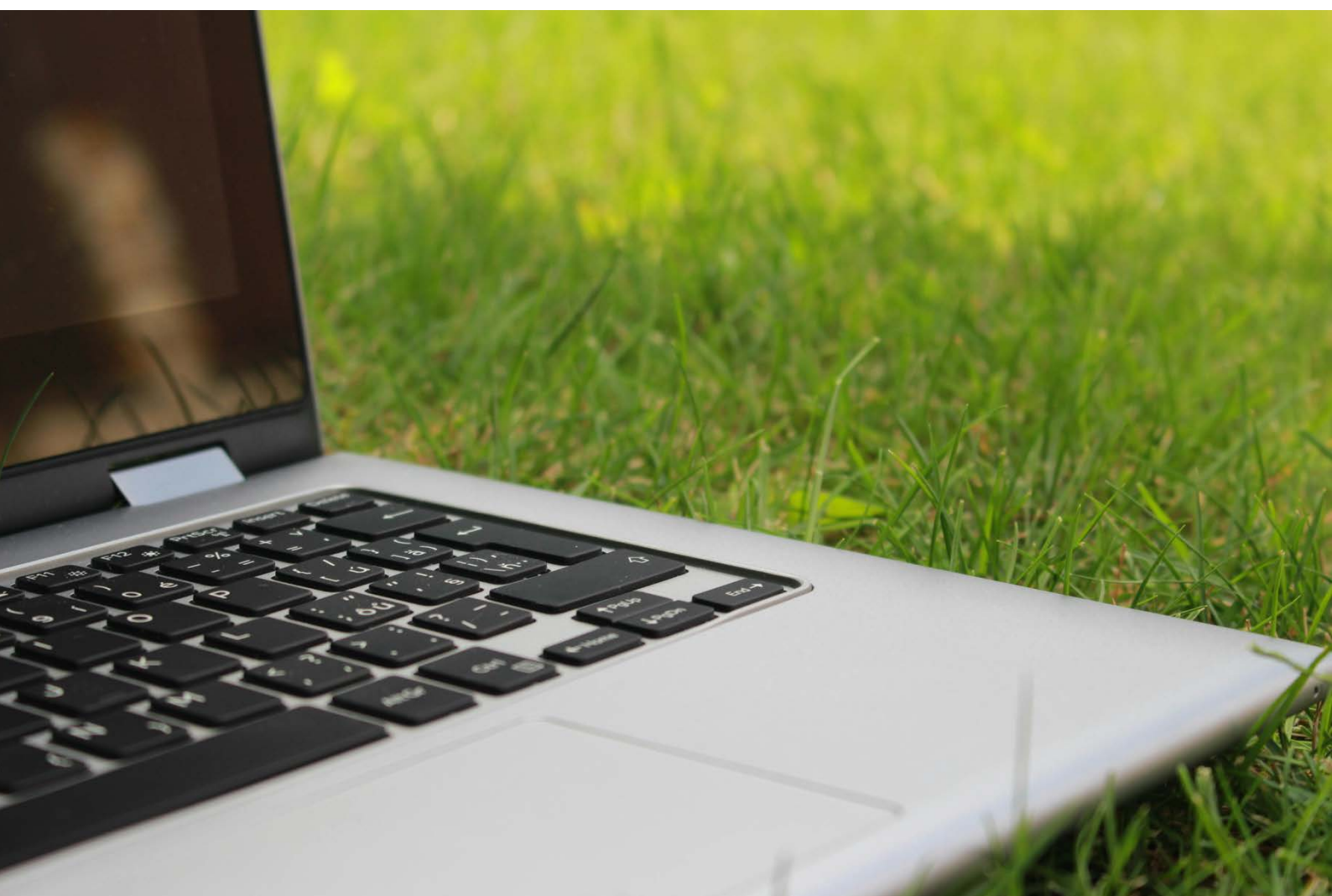


Funded by  
the European Union

7 CHAPTER

DIGITAL

COMPETENCE



# Digital competence



Digital competence involves the confident, **critical and responsible** use of, and **engagement with**, digital technologies for learning, at work, and for **participation in society**. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking.

## Knowledge

Individuals should understand how digital technologies can **support communication, creativity and innovation**, and be aware of their opportunities, limitations, effects and risks. They should understand the general principles, mechanisms and logic underlying evolving digital technologies and know the basic function and use of different devices, software, and networks. Individuals should take a critical approach to the validity, reliability and impact of information and data made available by digital means and be aware of the legal and ethical principles involved in engaging with digital technologies.

## Skills

Individuals should be able to use digital technologies to **support their active citizenship and social inclusion, collaboration with others, and creativity towards personal, social or commercial goals**. Skills include the ability to use, access, filter, evaluate, create, program and share digital content. Individuals should be able to manage and protect information, content, data, and digital identities, as well as recognise and effectively engage with software, devices, artificial intelligence or robots.

## Attitude

Engagement with digital technologies and content requires a **reflective and critical**, yet **curious, openminded and forward-looking attitude** to their evolution. It also requires an **ethical, safe and responsible approach to the use** of these tools.

## Links:

- 2022: [DigComp 2.2: The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes](#)
- 2017: [DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use](#)
- 2016: [DigComp 2.0: The Digital Competence Framework for Citizens. Update Phase 1: the Conceptual Reference Model](#)
- 2013: [DigComp: A Framework for Developing and Understanding Digital Competence in Europe](#)
- 2012: [Report on Online consultation Experts' views digital competence](#)
- 2012: [Digital Competence in Practice: An Analysis of Frameworks](#)

# Digital technology in the times of Maria Montessori

*“An education capable of saving humanity is no small undertaking; it involves the spiritual development of man, the enhancement of his value as an individual, and the preparation of young people to understand the times in which they live.”*

*Maria Montessori. Education and Peace*

If Maria Montessori could walk into a modern classroom today, she might be astonished to see children holding tablets instead of hands-on materials, researching with voice assistants instead of encyclopaedias, and learning from videos instead of impressionistic charts and stories. Yet, after the initial surprise, she would almost certainly settle into her familiar posture of observation—quiet, attentive, analytical. She would study the children, not the devices. She would take notes. And then she would begin asking questions—scientific ones.

*How does this tool affect the child’s concentration?*

*Does it support independence or create dependency?*

*Does it foster exploration or passive consumption?*

*What kind of human being does this environment help shape?*

Montessori was, before everything else, a scientist. Her educational approach arose from repeated cycles of observation, experimentation, and refinement. And it is this very scientific spirit that can guide our thinking about digital technology in Montessori environments today.

## Seeing technology through the Montessori lens

Montessori believed deeply that education must evolve alongside society. She observed that the early twentieth century was becoming increasingly mechanized and wrote, *“Wherever possible, mechanical contrivances are introduced for every detail of*

*practical life, so that our children may be fitted to take part in a civilization which is entirely based on machines.”*

In her time, “machines” meant typewriters, automobiles, or telephones. Today, our equivalents are smartphones, coding platforms, cloud-based documents, and artificial intelligence. The world has changed dramatically, but her message endures: children must be prepared for the world they will inhabit.

Yet Montessori would also caution us that preparation must respect developmental needs. Screens and digital tools are not inherently educational simply because they are modern. They must be introduced with intention, always in harmony with the child’s stage of development and always in service of independence, responsibility, and meaningful exploration.

### **Montessori the Scientist: weighing benefits and risks**

If Montessori were alive today, she would not rush to embrace or reject digital devices. She would study them. She would observe their effects on attention, creativity, relationships, and problem-solving. She would ask, *What are the measurable outcomes? How does this influence human development?*

Modern scientific research, such as guidance from the World Health Organization, helps provide balance. WHO recommends limited, developmentally appropriate screen use for children, and its rationale aligns closely with Montessori principles: screens should support learning, not replace movement, tactile exploration, or human interaction.

In a Montessori classroom, digital tools might be used in purposeful ways, where the digital moment sparks curiosity, but the real work—the exploration, experimentation, and internalization—happens through hands-on experience. This balance between mind and hand is quintessentially Montessori.

### **Montessori the Educator: technology as a meaningful tool**

Montessori classrooms have always incorporated the scientific tools of their era—globes, magnifying glasses, compasses, barometers, and other tools for exploration.

These were the “technologies” that allowed children to understand the world more deeply. If Montessori were designing an elementary classroom today, she would likely consider digital devices part of this continuum of tools, but she would insist they be used purposefully:

- for research
- for writing and publishing reports
- for designing presentations
- for coding simple algorithms that strengthen logic
- for exploring scientific or mathematical simulations impossible to reproduce physically
- for collaboration and communication with peers in other parts of the world



The tool itself is never the focus. The *development of the child* is.

As scholar Angeline Stoll Lillard notes, digital competence in a Montessori context is not merely about operating software; it is about “finding, analyzing, judging, integrating, and communicating information.” It is thinking work—not button-pressing.

### **Montessori the Anthropologist: preserving human dignity in a digital age**

Montessori’s work was not limited to pedagogy; she was also an anthropologist concerned with the role of education in shaping culture and society. Her reflections prompt us toward an important question: How does digital technology influence the child’s developing sense of self, community, and purpose?

In an age where communication is increasingly mediated through screens, Montessori’s focus on peace, empathy, and human connection becomes more vital. Digital competence must include ethical competence: *How do we communicate respectfully online? How do we verify information before spreading it? How do we*

*recognize bias, persuasion, or misinformation? How do we maintain healthy relationships with digital tools?*

These questions help the child maintain their humanity in a world where attention, identity, and emotion are often commodified.

### **Beyond the debate: toward true digital competence**

The question is not whether Montessori schools *should* use technology.

The real question is: How can technology serve the Montessori vision of education for life?

Digital competence, in this sense, is not about mastering devices; it is about understanding them—how they work, when to use them, and why. It means raising children who can think critically, collaborate responsibly, and create meaningfully.

In a Montessori environment, this might look like:

- researching Leonardo da Vinci's machines on a tablet,
- building a physical model inspired by his sketches,
- documenting the process through photos or videos,
- and presenting the final work to peers.

Here, digital technology enriches learning but never replaces the fundamental Montessori elements of curiosity, creativity, movement, collaboration, and purposeful work.

If Maria Montessori were alive today, she would not fear digital tools—she would study them. She would observe their effects, analyse their influence, and guide their integration with scientific rigor and deep respect for the child's developmental needs.

In doing so, digital competence becomes a natural extension of Montessori education: a preparation for life in both the physical and digital worlds, rooted in wisdom, balance, and humanity.

# From Curiosity to Digital Awareness: developing critical thinking in the Montessori classroom

In every Montessori classroom, curiosity hums softly in the air. It lives in the way children bend over a globe to trace the routes of ancient explorers; in their excitement as they discover that a humble caterpillar becomes a butterfly; and in the quiet triumph of solving a long-division problem for the very first time. This curiosity is not accidental — it is the essence of Montessori education. And it is from this wellspring of curiosity that authentic digital awareness and critical thinking begin to grow.

## **Freedom to Choose: the foundation of independent inquiry**

In a Montessori classroom, choice is sacred. A child moves to the shelf, selects a material, and begins to work — guided not by external rewards but by an inner spark of motivation. This same principle shapes their relationship with information. Whether they are researching volcanoes, Roman roads, or animal adaptations, children are free to explore and discover at their own pace.

But with freedom comes responsibility — the responsibility to think, to evaluate, and to understand. The ability to find information is not enough. Children must learn to interpret it.

From the earliest reading experiences, Montessori guides introduce activities that lay the groundwork for critical literacy. Command cards and “Who Am I?” cards encourage children to look beyond the surface — to interpret clues, extract meaning, and connect ideas.

When a child reads, “*I have a hard shell and live both in water and on land. Who am I?*” they are not simply guessing a *turtle*. They are practicing inference, deduction, and pattern recognition — the same mental habits they will later use to distinguish truth from misinformation in the digital world.

As children move into the elementary years, their curiosity evolves from *what* to *why* and *how*. They begin to see that knowledge is dynamic and that different sources can tell different stories.

## Story from the classroom

### Comparing sources and perspectives

*One afternoon, a group of upper elementary students researching the solar system encountered a curious contradiction. An older book in the classroom library still listed Pluto as a planet. The newer encyclopedia — and the websites they later checked — did not.*

*“Why does this book say Pluto is a planet, but the website says it isn’t?”*

*“Who decides what’s true in science?” “Does information change?”*

*Their teacher didn’t answer. Instead, the children investigated. They read articles about the International Astronomical Union. They learned how scientific classifications change over time. They debated whether Pluto should still be considered a planet.*

*Through this single discovery, the children understood something essential:*

*Knowledge evolves. Sources differ. Truth must be examined, not assumed.*

*They learned to check publication dates, question authorship, and seek confirmation from multiple perspectives. These habits form the foundation of digital literacy. Before children ever pick up a device, they are already practicing the skills of a critical thinker: comparing, questioning, and searching for evidence.*



Montessori Akademija, Lithuania

# Thinking, Not Memorizing: the art of questioning

In Montessori education, the goal is not to memorize facts but to learn how to think. Every material, every conversation, and every project encourages children to explore relationships, cause and effect, and the complexity of human experience.

History studies, for example, are never reduced to the question, “*When was the Industrial Revolution?*” Instead, children are invited into deeper reflection: *How did the Industrial Revolution change the way people lived? Who benefited from these changes, and who was left behind? If you lived during that time, what decisions would you have made?*

There is no single “correct” answer. These questions develop empathy, perspective-taking, and judgment — the pillars of critical thinking. This same mindset is essential for navigating the digital world. When children encounter online content, they must learn to ask: *Who created this, and why? What evidence supports it? Is there another perspective?*

Montessori education gives them the confidence — and the practice — to ask these questions with courage and clarity.

## Bridging digital awareness with Montessori thinking

When we nurture critical thinking in the classroom, we prepare children not only for academic learning but for life in the digital age. A child who compares sources in a library will naturally question what they read online. A child who explores bias in historical narratives will recognize bias in media. A child who practices respectful disagreement during group projects will approach digital communication with empathy and restraint.

Montessori education does not reject technology — it insists on mindful use. Just as we teach children to handle scissors safely, we must guide them to navigate the digital world with discernment and responsibility. By nurturing curiosity, independence, and thoughtful reflection,

we help children grow into responsible digital citizens — individuals who engage with information critically, ethically, and creatively.

The Montessori classroom does not simply prepare children to use technology. It prepares them to understand it. They learn not only how to access knowledge, but how to question it; not only how to consume content, but how to evaluate and respond to it with intelligence and integrity.



## Story from the classroom

### Critical thinking with digital tools

*In Montessori School Andílek, children who use digital tools for research learn to think critically through simple, powerful practices:*

- **Select at least two books in addition to digital sources** when preparing research.
- **Create comparison tables** noting the source, author, date of publication, style, and verifiability of information.
- **Compare textbooks from different countries** on the same topic to identify variations in perspective.

- **Find the same topic in three media forms** (book, online article, YouTube video/social media post).  
Then record:
  - date; medium
  - author; main message
  - purpose of the content
 Finally: compare differences and discuss why they exist.
- **Color-code facts and emotions** in a review: How does the author use each?
- **Change the point of view:** compare how two media sources describe the same historical event, then write an article reflecting a chosen viewpoint or interest.
- **Community circle topics** such as:
  - How do we recognize a credible source?
  - Are there more risks on the internet or in books?
  - Have I ever believed something that later turned out to be false?
  - How do we distinguish information from opinion?
- These activities do more than teach “digital safety.” They cultivate a mindset — a way of thinking that values truth, evidence, and reflection.



Montessori School Andilek, Czech Republic

# From real life to digital life: learning to choose good over bad

## **Recognizing security as a human need**

In Montessori education, the Fundamental Needs of Humans lesson always brings a moment of grounding. Children sit together and consider what every human being—past and present—needs to live with dignity: food, shelter, protection, transportation, community, art, spiritual needs. As the conversation flows across time and cultures, they begin to understand that security is not merely the absence of danger; it is a condition that allows growth.

Today, children must navigate a world where security has expanded beyond physical surroundings. The modern child must learn to protect their digital identity just as earlier civilizations protected their settlements. This raises an important reflection point for teachers: How do we help children recognize that their actions in the digital world carry real consequences, and that safeguarding their information is now a part of safeguarding themselves?

By framing digital safety as an extension of the universal need for protection, children can more intuitively understand why it matters—because it connects to something they already know deeply.

## **Moral development extends beyond the classroom walls**

Montessori classrooms are built to nurture moral sensibilities through lived experiences. Children learn fairness by negotiating roles in group work, compassion by helping a younger peer, and responsibility by caring for the materials that



belong to the whole community. These experiences form the backbone of their ethical development.

Digital citizenship is simply another chapter in the same developmental story. A child who has practiced speaking kindly, observing turn-taking, and listening with respect is already prepared for parallel behavior online. The task for the teacher is not to introduce a new moral framework, but to guide children in recognizing continuity:

The same values that shape peaceful coexistence in the classroom shape peaceful coexistence online. When teachers view digital behaviour through the same lens as everyday social behaviour, it becomes easier to support children in developing consistency, clarity, and integrity across both worlds.

### **Helping children analyse choices—not memorize rules**

Montessori students thrive when we ask, “*What do you think?*” rather than “*Do as I say.*” The same principle must guide digital competence. Digital dilemmas—privacy, misinformation, respectful communication—cannot be solved with rigid rule lists. Instead, they require thoughtful analysis. Children must be able to ask themselves: *Is this respectful? Is this responsible? Is this honest? Is this safe?*

This is not about teaching children what to think but empowering them to *become thinkers*. Teachers can encourage discussion and reflection in the same way we do with historical narratives or scientific questions. Each digital scenario becomes an opportunity to examine intention, impact, and ethical reasoning—skills that are increasingly vital as children encounter more complex digital environments.

### **The Guide’s Role: cultivating reflection, not policing behaviour**

Montessori teachers already know the delicate balance between freedom and responsibility. Digital life does not change this; it reinforces it. The teacher’s role is not to monitor every digital choice a child makes, nor to create fear around technology. Instead, it is to cultivate habits of reflection, empathy, and self-regulation—skills that prevent harmful behaviour before it arises.

When children understand *why* something matters, they no longer rely on external enforcement. They begin making decisions based on internalized values, shaped by years of community life, mutual respect, and independent work.

Teachers can support this by:

- Observing how children discuss fairness or justice in real situations.
- Encouraging open conversations about trust, privacy, and respect.
- Highlighting connections between classroom behaviour and digital interactions.
- Creating space for children to ask difficult questions without fear.

In this way, digital competence becomes a continuation of the Montessori vision: helping children grow into individuals who act with conscience, compassion, and clarity.

Ultimately, the transition from real-life morality to digital morality is not a leap—it is a gentle extension of what Montessori education already does beautifully.

Children who feel safe will seek to make others feel safe. Children who understand responsibility will act responsibly online. Children who think critically will not follow misleading information blindly. Children who experience respect will become respectful participants in digital spaces.

The digital world does not require a different kind of child. It requires the same grounded, thoughtful, self-aware individuals Montessori education has always sought to cultivate. As Montessori teachers, our task is to help children carry their well-developed moral compass into every part of their lives—including the one that happens behind a screen.

## Story from the classroom

### Conversations about digital life

At Montessori school **Andílek**, conversations about digital life are woven naturally into everyday school culture. They arise in community circles, during IT classes, on the farm stay, and in informal moments when children bring real experiences to the group. These are not isolated lessons but an ongoing dialogue—one that includes teachers, students, and parents working together.

- respectful online behaviour - emails, messages, groups - this is connected and establishes civility in casual situations.

- lessons in grace and courtesy: How to write a comment that doesn't offend?  
Responding to online teasing (e.g. Don't respond immediately, don't write anything you wouldn't say face to face, give support to the person being teased...)
- appreciation of others' contributions after working together online (I appreciate that you added a chart...)
- perception of humor and boundaries - e.g. watch a meme together - who is it funny for, could it make fun of someone, how do I know this boundary - rule: if you hesitate, don't post.
- respect for privacy: when to share something? Do I have permission? Could it hurt someone? Does it make sense to post it?
- community circle discussion: how would I feel if someone wrote about me like this? When was the last time I showed kindness online? How can I be a support to others online?
- education for digital citizenship: verifying information before sharing it. Handling your own digital footprint responsibly. Respect for platform rules and community policies. Awareness of the impact of one's own actions on others. Ability to admit a mistake and correct it e.g. deleting misleading content
- we use external lectures, refer to free websites such as [www.hoax.cz](http://www.hoax.cz) or [www.snopes.com](http://www.snopes.com)

Montessori School Andilek, Czech Republic



# From screens to reality: helping children find true heroes in the digital era

Every Montessori guide knows the moment well: a child bursts into the room, energized by something unbelievable they've just seen online. "Someone solved a Rubik's cube in under five seconds!" "I watched a climber scale a mountain without any ropes!" Their voices rise with awe, and we can feel the genuine admiration behind their words. In these moments, we witness a deep and beautiful truth about the elementary child: the longing for heroes.

Maria Montessori described children in the second plane of development as seekers of greatness. They are drawn to the extraordinary—to courage, intelligence, strength, determination. It is the age of imagination and moral exploration, when children look for role models who can show them what human beings are capable of.

In today's world, however, many of the "extraordinary" figures they encounter first are YouTubers, gamers, TikTok personalities, or celebrities. These digital figures are often exciting, but their contributions may be narrow, fleeting, or grounded in performance rather than meaningful achievement. Yet the children's admiration is real—not because they are "obsessed with screens," but because they are in a developmental stage that naturally seeks inspiration. The question for us, as educators and parents, is gentle but essential: How do we help children expand their vision of heroism beyond what the digital world offers?

## Guiding children toward real heroes

Montessori education gives us a remarkable advantage: our classrooms are already rich with real human achievement. Cosmic Education, in particular, offers a vast landscape of extraordinary individuals and forces that have shaped our world.

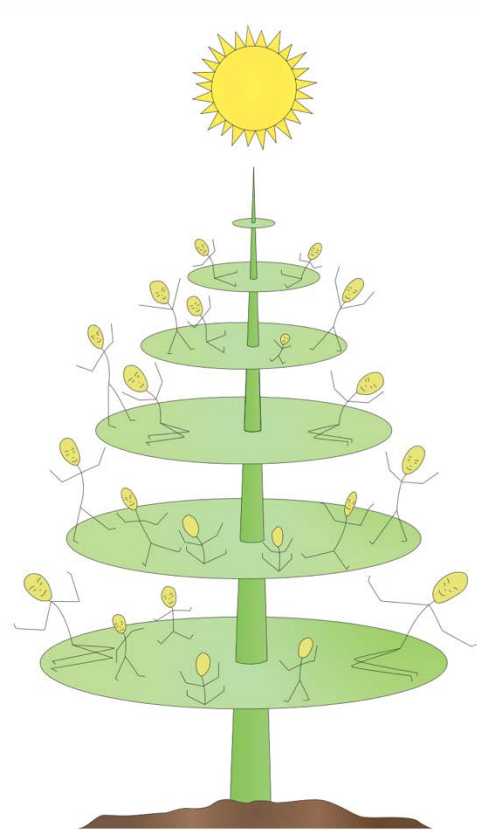
We introduce children to:

- **The invisible heroes of nature**, like bacteria that enrich soil or trees that produce oxygen.

- **The great forces**, such as air and water, portrayed in impressionistic charts as powerful agents sculpting the Earth.
- **The pioneers of science and history**—Galileo challenging tradition, Marie Curie risking everything for discovery, Nelson Mandela working tirelessly for justice.

These stories give children not only *information* but *inspiration*. They help children see that heroism exists in many forms and that extraordinary contributions often come from dedication, perseverance, and service.

Children begin to understand that the world is full of heroes who have shaped civilizations, saved species, cured diseases, created art, or explained the mysteries of the universe. Their concept of “greatness” expands from digital icons to the extraordinary real figures who have changed the world.



### **Balancing digital life with real-world encounters**

Of course, the digital world is part of children’s lives. They will continue to watch videos, follow online personalities, and admire the talent they see on the internet. The aim is not to suppress that interest but to balance it with rich, lived experiences.

Imagine if some of the time spent in front of screens was replaced with encounters like these:

- Visiting a beekeeper and learning how bees sustain entire ecosystems.
- Meeting a local firefighter and hearing stories of courage rooted in service, not entertainment.
- Exploring ancient ruins or museums where the achievements of civilizations come alive.

- Watching a biologist release rehabilitated birds back into the wild.
- Reading about engineers who design clean-water systems or scientists working on climate solutions.

Children who experience real heroes in action develop admiration that is deeper, more grounded, and more nourishing. They learn that greatness is not just about popularity or extraordinary talent—it's about contribution, persistence, and the desire to make life better for others.

This shift doesn't require dramatic interventions. It grows naturally through: honest conversations, hands-on experiences, storytelling, and a community culture that celebrates meaningful achievement over digital fame.

As Montessori educators and parents, our work is not to steer children away from digital influencers, but to open the world wider. When children have access to real explorers, scientists, activists, artists, and everyday heroes in their community, something begins to shift. They start asking different questions:

- What can I contribute?
- Where are my talents needed?
- Who helps others in ways we don't always see?
- How did this person become who they are?

When digital figures reappear in conversation—as they will—the children approach them with a more balanced perspective. The digital world no longer defines their sense of heroism; it becomes one of many sources of inspiration.

In the end, the goal is not to choose heroes for children, but to help them develop the inner sense that recognizes: effort over spectacle, substance over appearance, contribution over popularity.

Montessori elementary education is uniquely positioned to do this. Through cosmic stories, scientific exploration, historical narratives, and connections with the community, we help children discover the extraordinary everywhere—in forests, oceans, laboratories, ancient civilizations, and the human heart.

By guiding children from screens back into the richness of reality, we help them find heroes who are not only impressive, but meaningful. Heroes who show them what it truly means to be human. And in discovering those heroes, children slowly begin to imagine the kind of hero they themselves might one day become.

## Story from the classroom

### Discussions with children

*In Montessori schools Andilek we usually discuss these topics with children in the lectures of ethics or civic education.*

- *we share with children stories of real heroes (paralympic athletes etc.),*
- *try to get to know youtubers and influencers in real life (e.g who films stories and talks about healthy eating...*
- *we have media workshops regularly - the students try to make their own podcast or other activities - transferring the online world into reality - realizing what is behind the work of influencers.*



Montessori School Andilek, Czech Republic



# The Need for Communication and Belonging: from classroom community to digital connection

In a Montessori elementary classroom, children naturally seek connection. They collaborate on projects, share discoveries, and negotiate roles during group work, building social skills and a sense of belonging. Community meetings/agenda or gratitude circles provide a safe space for children to express thoughts, reflect on experiences, and practice empathy, laying the groundwork for respectful communication. The guide models dialogue, helps resolve conflicts, and encourages every voice to be heard, reinforcing that communication is about understanding and being understood.

These same principles extend into the digital world. In Montessori classrooms, digital communication is used purposefully, often for collaboration with peers in other schools or for sharing research projects. Children write emails, create shared documents, and produce digital presentations, applying the clarity, tone, and etiquette they have practiced in person. For example, in a joint project on local ecosystems with students from another country, children must plan tasks, exchange data, and present findings online. Here, digital tools are not a substitute for face-to-face interaction but a bridge that allows children to extend their collaborative skills globally.

Digital interactions in Montessori classrooms often revolve around purposeful, real-world tasks that require careful communication. When planning a field trip or “going out” experience, children might draft emails to museums, nature centers, or local experts to arrange visits, ask questions, or request materials. They learn to clearly express their intentions, coordinate logistics, and collaborate as a team to ensure every detail is considered. Through these activities, children practice digital etiquette—writing polite, concise messages, checking for clarity, and responding thoughtfully to replies. These experiences mirror the classroom’s culture of empathy and responsibility, showing children that digital communication is not only a tool for sharing information,

but also a way to build relationships, solve problems, and participate actively in a wider community.

By integrating these experiences, Montessori education helps children navigate the digital world responsibly. Communication becomes a tool for connection, collaboration, and community, allowing children to transfer the values of empathy, clarity, and respect from the classroom to any digital environment. In this way, digital competence is not just about using technology, but about maintaining the social and moral foundations essential for meaningful interactions.

## Story from the classroom

### Building community in a Zoom room

*When Covid suddenly closed the doors of Montessori akademija, it felt as if the heartbeat of the school had paused. The classrooms, usually filled with soft conversation, children working with materials, and the hum of purposeful work, fell silent. Yet within just a few days, that same heartbeat found a new rhythm—this time inside a digital Zoom room.*

*We didn't simply "move lessons online." Instead, we worked to rebuild the warmth, connection, and community that our Montessori children knew so well. The first Zoom sessions were filled with shy waves and curious smiles. But soon, the digital room became a new kind of classroom—one where children could still see their classmates, share their work, and feel that they belonged. Each morning began with the same familiar rituals. We sang our greeting songs, sometimes a little off-beat due to internet lag, and danced together in our living rooms. Birthdays were celebrated with cheerful singing. Some sessions became drawing workshops, where children proudly held their pictures up to the camera. Other days were for games—memory challenges, scavenger hunts around the house, or simple guessing games that filled the screen with laughter. We also had quiet moments. Conversations where children talked about their feelings, their pets, or what they cooked with their families. These were the moments that reminded us that the Zoom room was not just a space for learning—it was a space for being together.*

*The digital materials, stories, presentations, and lessons helped keep Montessori work alive. But it was the togetherness—the shared songs, the silly dances, the whispered "I miss you"—that truly carried the community through. What began as a temporary solution became a*

*testament to resilience: even when the school building was closed, the Montessori spirit remained open, connected, and alive. In those months, Montessori akademija didn't just teach children online. We held them together.*

Montessori Akademija, Lithuania



# Cosmic Education - giving the whole

At the heart of Montessori elementary education lies Cosmic Education, a framework designed to give children a sense of the interconnectedness of all knowledge. Rather than teaching subjects in isolation, Cosmic Education weaves together history, biology, geography, science, mathematics, geometry, language, and the arts, allowing children to see how each discipline contributes to a greater understanding of the world. Through this approach, children begin to recognize their place in the universe and understand that every action, discovery, or creation is part of a larger story. This vision fosters critical thinking, curiosity, and the ability to make connections across multiple domains of knowledge.

In practice, Cosmic Education is visible throughout the Montessori classroom. When students study the solar system, they don't merely memorize planets; they explore planetary movements through models, calculate distances using mathematics, read historical accounts of astronomers, and reflect on the ethical implications of space exploration. Similarly, lessons on agriculture might integrate biology, climate science, human history, and artistic expression, allowing children to appreciate the full spectrum of cause and effect. Every subject becomes part of a coherent narrative, helping children understand not just facts, but relationships and purpose.

## **The Role of Digital Technology in Cosmic Education**

In today's world, digital technology can play a supportive role in Cosmic Education, but its use must be intentional and purposeful. As Greg MacDonald points out, the question is never simply "Should we use technology?" but rather: Does this digital tool serve a specific educational purpose? Does it provide an experience that cannot be achieved otherwise? Does it enhance a group project, research task, or creative endeavor in a meaningful way? When approached thoughtfully, digital tools can function like Montessori materials—carefully curated, purposeful, and developmentally appropriate.

In Montessori classrooms, digital resources are often integrated to complement hands-on exploration. For example, upper elementary students might use a digital microscope to observe pond life they collected during a field trip, or they might create a multimedia presentation on the water cycle, combining their own observations, photographs, and research from reputable online sources. Teachers guide children in using these tools safely and collaboratively, emphasizing ethical digital practices, respect for privacy, and responsible communication. Just as children learn to handle delicate scientific equipment with care, they are taught to navigate digital devices with mindfulness.

Digital tools should be treated as classroom materials, just like Montessori materials, and should fully conform to Montessori philosophy and practice. Their use should be intentional, meaningful, and developmentally appropriate. Key considerations for integrating digital tools in a Montessori classroom:

- Carefully constructed presentations – Digital tools should support Cosmic Education by providing well-curated, purposeful content.
- Considerations of safety – Children must be guided in using technology responsibly and safely.
- Access and usage moderated by purpose and classroom community – Digital devices should be used collaboratively and with a clear purpose.
- Access and usage increase parallel to age – Younger children should engage in hands-on learning first, with digital tools introduced gradually as they develop the capacity to use them thoughtfully.

### **Meeting the needs of the second plane child**

Children in the second plane of development, ages 6–12, are naturally driven by curiosity, a desire for intellectual exploration, and a need for meaningful social interaction. The digital world can meet many of these needs: it offers immediate access to information, opportunities for collaboration with peers across distances, and tools for creative expression and problem-solving.

However, Montessori educators remain vigilant: digital engagement should not replace real-world experiences but rather enhance them. A lesson on ecosystems might begin

with a walk in the forest, followed by digital research on endangered species, culminating in a student-created infographic. This sequence maintains the integrity of hands-on learning while introducing technology as a thoughtful extension, not a substitute.

### **Balancing the whole with digital competence**

Cosmic Education gives children a vision of “the whole”—an integrated understanding of the world and their place in it. Digital tools, when used intentionally, can support this vision, providing access to information, collaborative platforms, and creative outlets. In the Montessori elementary classroom, teachers guide children to see technology as a tool for discovery, research, and communication, not as a replacement for curiosity or real-life engagement.

By combining Cosmic Education with responsible digital use, children develop both a broad perspective on knowledge and the competence to interact thoughtfully with the digital world. They learn to navigate information critically, collaborate respectfully, and apply digital resources ethically. In this way, Cosmic Education and technology together prepare children not only for academic success, but for a life of exploration, responsibility, and meaningful participation in an interconnected world.





# The digital world - a new learning environment

*"The children of today will make all the discoveries of tomorrow. All the discoveries of mankind will be known to them and they will improve what has been done and make fresh discoveries... The future generation must not only know how to do what we can teach them, they must be able to go a step further."*

*Maria Montessori, The 1946 London Lectures*

In a Montessori elementary classroom, learning happens everywhere. Traditionally, we talk about two main environments: the indoor classroom, carefully prepared for self-directed exploration, and the outdoor world, where children take their learning into real-life experiences. But today, there is another space that cannot be ignored: the digital environment. It is not separate—it is woven into the way children engage with knowledge, people, and the world around them.

Inside the classroom, children move freely between shelves, choosing materials that capture their interest. One child may trace the contours of a map while another measures ingredients for a baking project. The indoor environment is full of possibilities for hands-on learning, concentration, and social interaction. It is here that children practice independence, refine skills, and explore ideas at their own pace. Each material, each lesson, is intentionally placed to guide them toward understanding, while allowing room for curiosity and personal discovery.

Outside, learning extends into the world beyond the walls. Montessori called these experiences “going out,” emphasizing that they are more than simple field trips. They are student-driven explorations, requiring children to plan, research, and act responsibly. Imagine a group preparing to visit a local museum. They begin by finding the contact information online, sending a carefully written email requesting a guided tour, checking the bus timetable on an app, and calculating the travel time to arrive punctually. They might call the museum to clarify details or follow navigation tools to ensure they reach the destination. These experiences teach organization, communication, and problem-solving, while fostering a sense of autonomy and confidence.

In today's world, these experiences often blend with digital tools, creating what we might call a third learning environment: the digital space. It is an extension of both indoor and outdoor learning, offering children new ways to explore, connect, and create. Just as they learn to use Montessori materials thoughtfully, children can be guided to navigate websites, evaluate online information, or communicate digitally with institutions and peers. For instance, a student preparing a report on local wildlife may research species online, verify facts with books from the classroom library, and then write an email to a wildlife expert for clarification. In doing so, the child applies critical thinking, ethical reasoning, and communication skills—all within a purposeful digital context.

Digital tools can also support collaboration and reflection. Children learn to compose respectful emails, participate in group discussions across schools, or share project updates with peers in another country. They explore digital maps to plan excursions, schedule meetings, and document their findings. At every step, the teacher acts as a guide, observing, suggesting, and fostering conversations about ethical behavior, accuracy, and responsible digital citizenship.

Rather than seeing screens as distractions, the Montessori approach encourages us to view the digital world as a natural extension of learning. It complements hands-on exploration, outdoor experiences, and classroom collaboration. When thoughtfully integrated, digital experiences allow children to apply their curiosity, independence, and problem-solving skills in new ways, preparing them to navigate a complex and interconnected world.

In the Montessori elementary classroom, learning is never confined to a single place. Indoor, outdoor, and digital environments each offer unique opportunities for growth. By guiding children to use all three spaces intentionally, we equip them not just to consume information, but to explore, create, and contribute meaningfully—whether in the classroom, the community, or the digital universe.

## Story from the classroom

### Meaningful research transferred to digital form

*In our classroom children worked on the project about Ancient Civilizations. For weeks the children had been collecting facts, sketching artefacts, and reading stories about the daily life, inventions, and beliefs of these long-ago peoples. But now came the moment they loved: transforming all their discoveries into a digital presentation. PowerPoint became their tool of choice—simple enough for them to use independently, yet powerful in helping them give shape to their ideas.*

*Children dragged images onto slides, added titles, experimented with layouts, and proudly inserted their own drawings. The digital format helped them organise their thoughts: one slide for geography, another for achievements, another for cultural traditions. And as they worked, they talked—explaining to one another why a particular invention mattered or how a certain ruler changed history.*

*By the end of the week, the classroom felt like a small museum. Each child stood ready to guide their classmates through Babylonian gardens, Maya pyramids, or the golden age of Greece—this time not just by reading from a paper, but by showing their learning in living colour. With digital slides as their stage, their understanding became clearer, their communication more confident, and their excitement contagious. In this way, digital competence grew naturally—woven into meaningful research, respectful collaboration, and the joy of sharing knowledge.*



Jolly HOME SCHOOL, Slovakia

# Story from a school: Stewardship of the World: embracing sustainable practices with technology in school life

At our school, Andilek, in Czech Republic, we see digitalization not only as a path to modern and efficient management, but also as a tool that supports sustainable and responsible operation across the entire institution. Technology is a natural part of our everyday school life and leadership, allowing us to respond more flexibly to the needs of the times, our team, and our parents. We are building a digitally competent school culture that saves time, energy, and resources.

**Digitizing administrative and operational processes** is one of our top priorities. All administrative tasks – staff attendance, employment contracts, internal requests, training registrations, or vacation tracking – are handled electronically. For communication, planning, and task management, we use tools like **Slack** and **Basecamp**, which allow for transparent task distribution, deadline tracking, and collaborative work. **Shared calendars** and online planning help ensure that everyone stays informed about what's happening. For quick, informal communication, we also use **WhatsApp**.

We organize **hybrid staff meetings** – some colleagues attend in person, others join online. This flexible approach enables participation even for those who cannot be physically present. **Meeting notes** are generated using **AI features in Zoom** or by transcribing **voice recordings** with offline applications that ensure **GDPR compliance**. This system allows us to archive key decisions while avoiding unnecessary administrative overload.

In communication with parents, we use **electronic forms** that save time and streamline data processing – from absences to event registrations. All digital documentation is managed using secure tools without the need for physical printing. We also handle communication with authorities primarily through **electronic means**, such as **data mailboxes** and encrypted data transfers.

A major step towards simplifying our administration was the implementation of **electronic signatures**, enabling documents to be signed securely and conveniently from a distance. This saves both time and paper, while also significantly accelerating document flow without compromising data security.

One of the most visible examples of our digital approach is the **3D virtual tour of our school**, available on our website. It allows parents and prospective families to explore the school environment from the comfort of their homes – including classrooms, indoor spaces, and the school garden. Transparency, openness, and access to information are fundamental values for us.

A key digital support tool in our day-to-day work is **ChatGPT**, which we use to help prepare texts, internal documents, emails, and other materials. While it saves time and sparks inspiration, we always combine its use with a high level of **critical thinking** and **subject-matter expertise** to ensure the outputs are reliable, relevant, and usable.

We support our team and foster meaningful collaboration in several ways:

- New colleagues receive a **digital onboarding package** that includes all essential documents, guides, and overviews in one place for a smooth and quick orientation.
- We maintain a well-organized **electronic library** and shared folders via **Google Drive**, where staff can access teaching materials, methodologies, meeting notes, and workshop recordings. Each department, classroom, and project has its dedicated space.
- We regularly use **digital surveys** for both staff and parents – collecting feedback, event evaluations, mood tracking, and anonymous suggestions. This helps us identify needs in time and prevent potential issues.
- **Online appointment scheduling** allows parents to easily book consultations, admissions meetings, or classroom observations, reducing back-and-forth communication and streamlining organization.

In this way, technology helps us build a school that is **efficient, sustainable, and deeply human**. We minimize unnecessary administration, reduce paper use and

environmental impact, and provide clear, secure, and timely access to key information for both staff and families.

Our vision is a school that is not only modern and effective, but also mindful, open, and responsible. We do not view digital tools as the goal, but as a **means to fulfill our mission** – to create an environment where people can work, decide, communicate, and grow together. And it is often the invisible but essential digital infrastructure that makes this possible.

## Essential guidelines for developing digital competence at home: a Montessori-aligned approach

Developing digital competence in children begins long before they interact with devices. In a Montessori-aligned home, the focus is on building knowledge, skills, attitudes, and experience that allow children to navigate the digital world safely, responsibly, and creatively. Parents play a key role as guides, modeling ethical behavior, setting boundaries, and creating opportunities for purposeful digital engagement.

### **1. Start with critical thinking and information literacy**

Before children search online, help them practice evaluating information in everyday life. Encourage them to ask: Where does this information come from? Is it consistent with other sources? At home, this could involve reading together, comparing books, discussing articles, or analyzing simple videos. These early habits mirror Montessori classroom exercises and create a foundation for navigating online content responsibly.

### **2. Encourage purposeful communication and collaboration**

Children need to develop respectful and responsible communication skills. Support them in writing emails, creating shared documents, or participating in online discussions with peers, teachers, or institutions like museums. Emphasize clarity, politeness, and awareness of how words affect others. Encourage them to

acknowledge contributions, listen actively, and collaborate thoughtfully—just as they do in Montessori group activities.

### **3. Promote responsible digital creation**

Digital tools can be powerful means for expression and problem-solving. At home, guide children to use apps or programs to create stories, presentations, or multimedia projects. Teach them about copyright, intellectual property, and ethical sharing. Explain that creating digital content is like any other creative work—it requires care, responsibility, and respect for others' contributions.

### **4. Emphasize safety and privacy**

Children must understand the importance of privacy and online safety. Discuss what is safe to share, when to ask for permission, and how to protect personal information. Reinforce the idea that their digital footprint is lasting and that they should always think about the potential consequences of online actions. Montessori philosophy supports these lessons by connecting ethical awareness and respect for others from the classroom to the digital environment.

### **5. Develop problem-solving skills**

Encourage children to approach digital tools with curiosity and confidence, exploring, experimenting, and troubleshooting when things do not go as planned. This Montessori principle of learning from trial and error helps children become flexible and creative in solving digital challenges, fostering independence and resilience.

### **6. Set clear boundaries and balance screen time**

Montessori classrooms introduce screens selectively and purposefully, typically in upper elementary years, for research and creative projects. At home, establish clear guidelines on screen use, emphasizing balance with hands-on activities, outdoor play, and social interaction. Discuss the risks of excessive screen time, misinformation, and online distractions, helping children understand both benefits and limitations of technology.

### **7. Reflect and discuss ethical digital behavior**

Create opportunities for conversations about online interactions. Ask: How would this message feel if it were about you? How do we respond to teasing or misinformation online? How can technology be used to help others or solve problems? These

discussions connect ethical reasoning, empathy, and moral development—core elements of Montessori education—to real-life digital experiences.

### **8. Use technology for meaningful projects**

Support children in applying digital skills to purposeful work. Examples include collaborative school projects, community initiatives, or creative storytelling. This approach aligns with Montessori philosophy, treating technology as a tool for exploration, learning, and contribution—not passive consumption.

By guiding children with these principles, parents help them develop digital competence that mirrors Montessori values: independence, critical thinking, ethical awareness, and purposeful engagement. Digital tools become a complement to real-world experiences, supporting growth without replacing the hands-on, experiential learning that forms the foundation of Montessori education.



<b>How digital competence is visible in Montessori Elementary classroom?</b>	
<b>Essential knowledge</b>	
How digital technologies can support communication, creativity and innovation	Children use email or child-safe collaborative platforms to contact museums, plan “going out” experiences, or communicate with students in partner schools abroad. They can create digital presentations, videos, or newsletters about projects on science, history, or environmental topics. Teachers guide them in using digital tools to express ideas, not just consume content. They use digital tools for research.
The opportunities, limitations, effects and risks associated with digital technologies	Students discuss the benefits of technology for research and collaboration, the limitations of online information (bias, misinformation), and potential negative effects of overuse. Role-play and storytelling exercises illustrate cyberbullying, privacy concerns, and the consequences of sharing personal data.
The general principles, mechanisms and logic underlying evolving digital technologies	Students engage in coding simple algorithms that strengthen logic, implying an understanding of the underlying principles of programming.
The basic use and function of different devices, software and networks	Students are introduced to tablets, computers, cameras, and collaborative apps. They practice basic functions: typing, searching for information, saving documents, and using digital maps for “going out” activities. Teachers show how the internet works as a global network connecting people and information.
Validity, reliability and impact of information and data made available by digital means	Children compare multiple sources for a topic, noting the author, publication date, format, and purpose. They analyze content for bias or accuracy using classroom discussions and exercises like comparing textbooks, websites, and videos. Various classroom build early skills in verifying and cross-referencing information, critical thinking.
Legal and ethical principles involved in engaging with digital technologies	Students learn about copyright, intellectual property, and the importance of asking permission before sharing others’ work through various Grace and Courtesy activities. Teachers facilitate conversations about ethical digital behavior, respectful communication online, and digital footprints. Students practice responsible sharing and correction of mistakes.
<b>Core skills</b>	
Access, use, filter, process and evaluate digital content	Children use search engines, school-approved databases, or curated websites to gather information. They extract relevant information, compare multiple

	sources, and reflect on accuracy, reliability, and purpose.
Create, program and share digital content	Students design presentations, digital stories, school newsletters, videos, or simple apps for class projects. They learn to credit sources, paraphrase, and respect intellectual property.
Manage and protect information, content, data and digital identities	Children discuss privacy and public sharing, practice safe passwords, and reflect on what information is appropriate to share. Lessons about journals and online work help them understand boundaries and digital identity.
Use digital tools to produce, present and understand complex information	Students use apps (like Canva) or slideshows to synthesize research, create charts, or communicate findings in collaborative projects. They can combine visuals, text, and multimedia for clear presentation.
Recognize and effectively engage with software and devices, artificial intelligence and robots	Depending on situation children explore coding robots, digital microscopes, and interactive simulations. They experiment with AI tools for research or creative purposes, always guided to question results critically.
Use digital technology to support their creativity and to collaborate with others towards personal, social or commercial goals	Children work in pairs or groups on digital projects such as school newsletters, environmental campaigns, or presentations for community circles. Digital tools can be used for collaboration with international Montessori schools online.
<b>Attitudes (students value)</b>	
Applying a reflective and critical thinking approach	Students discuss the reliability of information, the effects of their digital actions, and possible alternative solutions. They reflect on mistakes and evaluate their digital creations.
Being curious, open-minded and forward looking	Children explore new apps, tools, and research methods. They ask questions, compare sources, and experiment with technology in the context of real-world projects.
Using an ethical, safe and responsible approach to the use of digital content and tools	Respect for privacy, safe sharing, responsible communication online, and awareness of consequences guide all digital activities. Teachers discuss online teasing, data security, and respectful engagement.
Engaging in communities and networks for cultural, social and/or professional purposes	Students collaborate with peers in other schools or online communities, participate in joint projects, or communicate with experts. Digital interactions extend their sense of belonging and social responsibility beyond the classroom.