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The Technology Screen

a compilation by three authors

Many parents and schools struggle with the issue of technology, and we frequently receive requests for an explanation of Dr. Montessori's view on this topic. Within our community there are some people who have very capably addressed the questions surrounding the use of computers and television. In this parent supplement we combine the ideas of three authors—an AMI trainer-medical doctor and psychiatrist, a trained administrator, and a researcher—who share their comments based on Montessori's theories of child development.

Jumpstart Baby by John Long

"Blocks vs. Bytes" read the title across the front page of last Friday's technology section of the *Houston Chronicle*. It was a story about computer use by young children—very young children. Software sales to children under five more than doubled last year. "There is no minimum age level to computer introduction," said Corinne Rupert, the child psychologist who served as an advisor on *Jumpstart Baby*, a new software program that targets children from 2 years down to 9 months old.

This is a lucrative business and it is understandably attractive to us parents who want our children to have every advantage, but what does it mean for the children? Reflect on the title: blocks vs. bytes, low tech vs. high tech, old tech vs. new tech, concrete vs. ethereal, hands-on vs. virtual. Aren't computers hands-on? No. Although you touch the keyboard or the mouse if you are creating a cube or moving a block around on the computer screen, are you touching the cube? Do you have a sensorial impression in your hand and arm of

block? Of smooth, flat surfaces? Of straight, sharp edges? Of corners? Of breadth as experienced in hand span? Of weight as recorded in muscular memory? How many dimensions does a computer cube possess?

Dr. Montessori's dictum for the young child was, "Never give more to the mind than you give to the hand." Why not? When we are infants our primary receptor is the mouth. When an infant explores her world, everything goes in the mouth. A little later the hand assumes priority. Certainly the other senses are fully operant—the child sees and hears and tastes and smells. But the hands are most important in receiving information from the world. And preparation of the hands for adult life is absolutely critical, both in terms of large sweeping movements of the arms and in fine muscle control in holding tiny objects between the thumb and forefinger. Jacob Bronowski, the mathematician and philosopher who wrote *The Ascent of Man*, said, "The hand is the cutting edge of the mind."

But isn't a child's hand at work in controlling the mouse? The child's hand is in movement but he is learning to control ephemeral, visual objects rather than the real objects of this world. Montessori aimed to put the child in contact with the real world, whereas computer experience disassociates the young child from the real world. Montessori spoke with concern about adults whose preparation for the professions was purely intellectual, excluding practical, hands-on experience. Children who learn through comput-

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ers are imprisoned by that experience because it does not generalize to the concrete media of the real world.

Isn't my child building concentration by sitting in front of a computer screen for increasingly long periods of time? It was Montessori's observation that young children walk away from periods of deep concentration with the materials in her classrooms refreshed from the experience. They are centered and calm. Young children working with computers or watching TV enter an almost trance-like state. This is clearly a different kind of mental activity than working with blocks. When children walk away from the TV screen or the computer terminal, they tend to be agitated, not calm. Clifford Nass, a professor at Stanford University who specializes in the interaction between people and computers, says that young children learn best when playing with real objects like puzzles and teddy bears,

along with other children or adults. "I think it's a really bad thing to slap them in front of a computer screen at a very young age," he said.

Was Montessori a technophobe? Certainly not. She said that young people must learn the most current technology of their age as a part of their education. Where is the place for computers in the life of a child? Begin during the elementary years. That is certainly early enough and corresponds more to the developmental characteristics of the child.

And when it comes to computer games and other video entertainment, it is my recommendation to equate that activity with TV viewing and to set consistent limits on viewing/playing time. Every minute spent in front of the TV or the computer screen is a minute that could be spent in more active and constructive pursuits. Thirty minutes per day would not be an unreasonable limit—except, of course, during *TV Turn-Off Week*.

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Television and the Young Child by Silvana Q. Montanaro, M.D.

What can be said today about television and the child? In the last decades we have accumulated a lot of information that helps us discuss and better understand the effect of television on children. The first questions we must ask ourselves are: What can television really transmit? And how does this happen? This leads to problems related to technology and a third question: Can this technology be neutral, depending on how we use it, or can it interfere with the child's emotional and intellectual growth?

The answers to these questions come from an examination of the negative characteristics of television, which are:

- reduction of real experience
- pathological effects on body and mind
- control by a few on the rest of the population

I will discuss only the first and sec-

ond points as they are more directly related to the young child.

Great Reduction of Real Experiences

All living creatures, but especially human beings, come into life with a natural potential for gaining knowledge. The first knowledge to be gained concerns the environment and the way humans can act in it. We need information—sensory input—and we need to store the information in an "ordered way."

Information comes from the environment. In order to develop a rich and ordered mind, children need to be in touch with reality. Research has found that the average child spends a minimum of four hours a day in front of the television (and much more on Saturdays and Sundays). This is an average of two thousand hours per year! All these subtract from the total hours possible for direct contact with reality for each child.

We must ask ourselves: Can the external world be transmitted from a television screen? Can all the dimensions necessary for knowledge and mastery of reality be perceived through television? Can time, space, landscape, and context reach those watching the screen in the dark of a room?

In a world in which many important natural experiences are made difficult or impossible for children, television reduces, even more, the direct relationship with reality. Children cannot gain correct information about the world around them. This limiting and distorting of basic information influences them throughout their life as they need clear and sure points of reference in order to deal with the world.

Only direct experience can produce personal knowledge. If we always depend on television for information, we detach from reality and lose the capacity to judge what is really happening.

Becoming human is a time-consuming task that requires the participation of other human beings. This basic necessity manifests itself from birth when, for apparently biological and survival reasons, newborns must have at least one human being from whom food and care are received. With food and care

given in the proper way, children gain knowledge of the environment and are given behavioral models that will be utilized in an active and personal way.

Television is a machine, an object, and lacks the indispensable qualities needed for helping human development whose goals are self-consciousness and independence.

Sensory information, followed by observation, concentration, and repetition are necessary for learning. Each child, in his/her uniqueness, needs to be allowed to stay with the observed object for as long as necessary in order to reach a complete sensory input of the object. This time brings the concentration necessary for establishing a long-term memory of the collected data, the acquisition of a new page in our "living library." Repetition is part of this process. But television, like all other mass-media, gives continuous, one-way information with no possibility of prolonged observation and personal action or interaction.

When children spend many hours every day in front of television they are deprived of "learning by doing," the experiences necessary for establishing the basic cognitive and psychological growth that will sustain them throughout all future life's activity.

It is correct to say that television, contrary to what they want us to believe, is an anti-experience and an anti-knowledge machine because it separates individuals from themselves and from the environment and makes them believe they are living while they are only observing passively what other people decide to make them see.

The negative effects of television on young children show clearly at school time. Primary teachers report a significant decline in the manual abilities of five- and six-year-olds. They also complain about greater passivity in playing in general, inability to concentrate on a given task, and difficulty in listening to people when they speak.

Pathological Effects on Body and Mind

Now we must bring our attention to the pathological effects of television on

the human body and mind. In order to better understand these effects we need to recall briefly the relationship between light and living beings—a branch of science referred to as photobiology.

The only form of natural light is sun and moonlight, and we do not know much about the latter. Sunlight comes from a mixture of seven fundamental colors in a special proportion. Plants utilize this light for photosynthesis which enables them to have the biochemical reactions necessary for their growth and maturation. But if plants are exposed to artificial light in which all colors are not present, or their proportion is changed, plants show a different model of growth.

The Environmental Health and Light Research Institute in Sarasota, Florida demonstrated that living beings are as highly affected by the X-rays emanating from television as they are from artificial light, especially fluorescent.

What can happen when human beings, many hours a day, ingest television x-rays and fluorescent television light composed only of red, blue, and green light rays? Hyperactivity syndrome and many allergies in children are now seen as having a relationship with television light as well as artificial food colorings. We are just starting to understand and measure many other undesirable physical reactions like obesity, high-cholesterol, aggressiveness, and cancer.

At this point we must clarify that what we call a television image is in reality a composite of many small fluorescent points which go on and off 30 times per second. It is only through the interpretation of the visual cortical area that these small points are composed into an understandable image. The continuous flash (which can cause a kind of epilepsy called "television epilepsy") is not perceived because our perception is possible at the conscious level only when there is a transmission rate of 10 times per second. This higher speed is used by "subliminal advertising" because the brain can receive the message while its conscious part is not aware of it. Nevertheless, the effects are obtained!

Images on the television screen are produced and perceived as a constantly moving field of winking dots and the eyes must remain fixed in order to track the moving image. As the images are very rapid, a continuous effort is necessary to capture them, and this work does not allow any conscious thinking, personal reflection, or criticism.

Without the filter of consciousness and critique, the television images enter into our brain but cannot be really integrated into our psychic apparatus, so they become like an undigested material that disturbs the functioning of the mind.

The continuous work needed to capture television images produces a mental attitude of passivity that impedes a personal elaboration of what is seen and makes it possible to accept everything that is seen. In order to think about the television images that are constantly produced in our unconscious, we should bring them to consciousness; but this is impossible when we look at television because the images continue to come one after the other, and there is not time for awareness.

Television gives pieces of information that lack context and meaning and are not integrated. It is absolutely different from what happens when reading because we can choose the book, we can read at our own speed, we can stop for reflection, or go back to a particular point. In this way, reading becomes a learning time in which the information can be united in an ordered way with what we already have inside, through the conscious effort and active participation of the reader.

To resist the power of television in our world is very difficult, but if we love children it is necessary to help them. Here are a few suggestions:

- no television until at least 5-6 years of age and then only when children are already able to write and read well
- television should ideally be viewed with adults who can comment on it and guide children to a more conscious understanding of what they are seeing

- make it possible for children to collaborate with us as soon as they can walk well so they are busy in real activities (practical life)

We are very important in the lives of our children and we can teach them how to use the "big toy" (the brain) we have. We can read together, play cards or chess, paint and ... talk! The family is the first place where children must live the values we say we believe in. In the family starts the transformation of society. In a more direct personal education, at home and in school, is the hope of a better future.

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The Growing Brain in a Changing World

by Jane M. Healy, Ph.D.

Although I am not a Montessorian, I find that the more I read current research about the developmental trajectory of the growing brain, the more I become aware that Maria Montessori already realized a great deal of what we know now—and she did it without the benefit of scanners, f-MRIs, and complex technologies. How did she do it? She watched children; she watched them sensitively, intelligently, and with an eye to appreciating how each youngster's pattern of development was unfolding. A very impressive accomplishment, and, unfortunately, not one often emulated in today's top-down educational systems!

I have devoted a great deal of personal thought to the question of what is happening to children in this pressured, unpeaceful, and mechanistic world we inhabit. My research has focused particularly on the increasingly "mechanistic" aspect of this world of childhood, as youngsters are ever-earlier "plugged into" electronic equipment and toys in an effort to "prepare them for the future" (such nonsense!), make them smarter (likewise nonsense), and, frankly, stay out of the hair of caregivers who have little time, respect, or patience for the critical processes of children's development. A colleague in New York recently referred

to current parent practices as "product development," and this observation may not be too far off the mark!

Thus my thesis is very simple, and yet all-too-complex: If we allow our children to be raised and educated by machines, we should not be surprised if they grow up without humanity. And it seems to me that the potential for peace in the world springs directly from our own humanity, which is directly related to the ability of the human brain to find peace within itself.

This personal ability to be at peace, both inside and outside, does not develop automatically, but is engendered in the brain by life experiences beginning even before birth, and it is highly dependent on the cultural milieu and value systems which surround it. No argument should exist that we here in the United States live in a culture of violence, when the most popular video game last year, *Grand Theft Auto*, includes scenarios which are too gross even to describe to a polite audience.

Not only does research clearly support the fact that such virtual violence engenders violent behaviors and thoughts in many of the young, but it is certainly possible that at least some of the documented "need" to drug many youngsters with powerful antipsychotic medications (for attention problems, for depression, for anti-social behaviors, etc., etc.) stems from rearing environments which are so out-of-sync with children's basic needs for a secure, safe, nurturing, and appropriately challenging environment.

Some are working with youngsters who are disadvantaged in far more obvious ways, struggling on the other end of the economic scale with, paradoxically, the same core issue, namely, a world that is all too ready to sell out children's developmental needs for more expedient gains.

While Montessorians are well-aware of the power of the developmental timetables built into the brain, it is also true that the growing brain is remarkably "plastic"; i.e., it can be shaped to a considerable degree by dominant external stimuli. Likewise, a lack of certain important input at "critical" or

"sensitive" periods may result in lasting deficits which are difficult or even impossible to remediate. These facts are clearly apparent in sensory areas of the brain (posterior or back of the brain), but they also apply to the anterior (frontal) areas with their rich connections into the emotional, subcortical, and even the motor systems. For the prefrontal cortex, it seems that many types of input and experience are important, with the most important being the emotional and cognitive scaffolding—or lack of it—provided by other human beings during the process of development. Clearly, Maria Montessori knew this. I believe she termed such scaffolding the "prepared environment." Surely she would be horrified at the environments which assault the minds and spirits of today's children, to wit:

- ♦ inappropriate media, which teach a child that the world is a dangerous place where others must be feared or even destroyed
- ♦ noisy, demanding electronic toys and games that substitute external stimulation for the internally guided processes of attention, motivation, and reflection
- ♦ an absence of adult guidance, even the assumption that children know more than do adults about raising themselves, leading to children who feel essentially unsafe and unprotected
- ♦ entrusting children's unsupervised "screen time" to the moral development of either profit-crazed advertisers or the "geek" culture of computer programmers
- ♦ and, I reluctantly add, public education which now plugs children into draconian factory-model "standards," violating the most basic realities of human development, individual timetables, and the brain's intrinsic need for both depth and time in the learning process

All these trends would appear to guarantee that, rather than educating children (and their brains) for peace, the United States, at least, is on the way to turning out ever more angry, disengaged, externalized, and fearful young

people. Such youth, who may never have experienced a quiet, self-controlled, internally peaceful mind, offer a poor prognosis for peace in the larger world.

Intelligence for the Future

Machines and technologies will not prepare young people for the future. Electronic technologies, in fact, mitigate against the neurological development needed to live one's life peacefully, either internally or externally. Our greatest hope for our students does not lie in "standards," in mechanistic learning models, or in digital one-up-manship. Rather it lies in our eminently human task: Helping them learn to think critically, create intelligently, and feel deeply.

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