

TECHNOLOGY, TOGETHERNESS, AND ADOLESCENTS: CREATING A MEANINGFUL ADOLESCENT LEARNING COMMUNITY IN THE DIGITAL AGE

by Ben Moudry

Ben Moudry has written a comprehensive overview of the current challenges facing parents, schools, administrators, and students regarding what he calls “handheld computers,” commonly known as smart phones. His annotated statistics and description of American society in 2015 are frightening in their clarity, while the percentages and numbers of technology overuse and distraction are increasing. From his position at The Grove School, Moudry describes a path to creating a community-informed technology policy that is aligned with the school’s mission, vision, and values and serves to improve communications and cooperation models for managing a farm.

I was born in the 1970s and grew up in the television, cable, and VCR era. I watched a lot of television and played many hours of home video games on the early game systems and computers. I also attended a computer camp, which I promptly left in the middle of the first morning crying because the technical side of computers did not intuitively make sense to me. I am not a luddite, but I don’t really use social media and my online life is purposefully limited or ignored. I also like to poke fun at the personal technology and online

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revolution by calling iPhones “iSolators” and calling the proliferation of handheld computers M.A.D. (Mutual Assured Distraction).

My first experience with a dynamic digital technology (beyond a calculator) at school¹ was when the school library started using an Apple II computer. It was a cream-colored, boxy machine with a black screen and pixelated green script. It was incredible. It was new to the school in 1983 and was very exciting for all of the students. The interest in using the computer was mostly for playing educational games like the famed Oregon Trail (history and geography), Where in the World is Carmen Sandiego? (geography), Odell Lake (science), Master Type, or math games that required calculation of simple operations to succeed.

The games were interesting, novel, and fun to play. I feel like I learned information or practiced skills when playing the games and there was often a social connection because I usually played with a friend. I wonder though what were the desired outcomes for introducing the computer, besides interest, engagement, and being able to say the school “had a computer.” I don’t remember receiving much training from the school about computer use other than learning how to turn it on, load the floppy disk, and how to turn it off properly. Did the teachers and school leaders carefully consider the positive and negative effects of bringing computers into school? This was the start of computers in schools, in homes, and eventually in hands.

The intent of this article is to share my experiences with building community in Montessori adolescent communities during the Digital Age and computer revolution, including the growth in numbers of handheld computers (HCs), known as smartphones.²

Present State of Digital Technology with Young People and American Society

There is a tense conflict quietly, and sometimes not so quietly, underway between teachers and young adults in most every school

1. The school Ben attended was Lake Country School in Minneapolis, Minnesota, A Montessori school for three- to fourteen-year-olds.

2. Calling a handheld computer a phone is like calling a Swiss army knife a toothpick, and that is clearly an understatement. I have come to call a smartphone what it is, a handheld computer (HC) that has the ability to make phone calls.

in many countries around the world. The tension revolves around the desire young people feel to connect with places, people, games, and information through handheld computers (HC) throughout every day. This tension is due to teachers trying to educate students, while students are often thinking about how or when they can use their HC again. This strong urge comes from their HC being the portal to fulfill their desire to connect socially, receive immediate feedback and information, and experience contentment through entertainment.

Through machinery man can exert tremendous powers, almost as fantastic as if he were the hero of a fairy tale. Through machinery man can travel with an ever increasing velocity, he can fly through the air and go beneath the surface of the ocean. So that civilized man is becoming more and more "supra-natural" and the social environment progresses correspondingly. (*From Childhood to Adolescence* 124-125)

Just having an HC in a person's pocket will cause them to think about the whole other world that is available to them through that device. They will be wondering about the information or opportunities for entertainment they are missing by not using or just checking their HC. This is not only an issue for young people though; this is an issue for adults as well. Public spaces are full of adults interacting with their HCs, often instead of each other or their children. It is interesting to look around and observe the percentage of adults using their HC in public spaces. Then look and see how many young children are watching their parents look at a screen or look at a screen of their own. It is the new pacifier not only for children, but for people of all ages. When adults have a moment of down time, they often take out their HC and see what they can find to pacify them.

The impact of HCs on young people's education, especially in middle and high school, is incredible. This impact is mostly due to reduced focus according to an article in *The Washington Post*:

Teachers reported that students are distracted constantly. Their memory is highly disorganized. Recent assignments suggest a worsening at analytic reasoning. Further, they wonder if we are creating people who are unable to think well and clearly. (Porter)

According to the Pew Research Center (Lenhart), in 2015, 73% of 13- to 17-year-olds have access to a smartphone and 24% of teens are on the internet “almost constantly.” Young people are also sending and receiving an average of over fifty texts a day. This means some are sending well over 100 texts per day. These statistics demonstrate how prevalent, important, and habitual using an HC is for young people.

These statistics are important because over the past five years these percentages and numbers are increasing. This is why Dr. Sharon Maxwell, a national speaker on the effect of digital technology,



The use of computers and digital technology does not remove the need for writing and interpersonal communication skills. Here a student is using the computer as a way to access information, but still is writing notes by hand on paper to consolidate the information.

states in her literature and presentations that digital technology is not a just a tool for young people, but a culture and way of life. This cultural connection with HCs is the reason for the tension between schools and young people. If students are not able to use their HC at school, then it is as if schools are limiting students' right to speak their native language or practice their religion.

Why Are Handheld Computers so Important to Adolescents?

Handheld computers are important to adolescents because they are important to adults and the adult world. They are also important because they are the basis for social connection, they are a status symbol, and they create new virtual spaces and opportunities for separateness from adults while at the same time togetherness among youth.

From birth, humans in much of the world are now trained to focus on the blue light, known as *high energy visible light* coming from a small device. With HCs being ubiquitous, a breastfeeding infant is exposed to that blue light shining on moms face while she looks away to the blue light instead of at the infant (see articles about "brexting"). Once a child can hold an HC, then their parents give them one to use, usually as a pacifier. The practice of using the TV as a babysitter has now gone mobile. Toddlers are now walking around stores, sitting at restaurants, or present at family events with a screen in hand. Parents are now relying on these devices to occupy and pacify their children throughout childhood. The statistics about the amount of time children spend looking at an electronic screen are staggering. The American Academy of Pediatrics reports on their website that an average American child spends seven hours a day on "entertainment media." This is why when a parent, school, or camp draws a line and does not allow children or adolescents to use electronics there will be frustration to full on rebellion. This reaction is due to the deeply engrained and learned reliance people have on access and use of a digital device or screen.

The unrest is not only from the children, but also from the adults, especially when it comes to adolescents. The growth in the prevalence of mobile phones and HCs has created a parent culture where the norm is to be able to contact and get a response within

a minute or less, from their son or daughter at any moment during the day. Many parents are upset and get worried when their child does not text them back immediately.

At The Grove School, when reviewing and rewriting the personal device policy last year, high school students brought this situation to my attention. Students reported their parents were causing a lot of the distraction at school due to parents texting students. Students reported their parents expected their sons and daughters to return texts immediately. If the students did not respond immediately, then the parents would continue to send texts and then call if the student did not text back. When I brought up the issue with the parent teacher group, some of the parents present admitted they expected immediate responses from their children because that was the norm. Clearly, the issue of technology use at school needs to be addressed and discussed with all groups at the school in order for the norms to be understood, established, and followed.

The habituated use of HCs for adolescents and parents, mixed with more general anxiety and parental fear, make a powerful cultural concoction. Schools now function in this climate and are trying to navigate it. The current digital cultural climate creates more difficulty for Montessori schools where the focus on interaction and connection with other people in person, tangible materials, the natural world, and the classroom or school community as a whole.

Technology Norms in an Adolescent Community

It is common practice for Montessori elementary classrooms and adolescent communities to re-establish norms each fall. However, one important difference between these levels is that adolescents are not children. Older adolescents are very adult-like and their independence, experience, and maturity change the dynamic of teacher to student working relationships. This change becomes all the more important when discussing two topics vital to adolescents: appearance and technology.

For in our times science has created a new world in which the whole of humanity is joined together by a universal scientific culture. Thus, children should learn to use machines habitually as part of their education. (*From Childhood to Adolescence* 125)

In regular school language, people call these topics “dress code” and “technology policy.” Both are “black hole issues³.” Teachers and administration will need to give mild attention to these issues every year and formally review them every three to five years. The review is necessary due to specific situations arising, new students wanting change, and the changing technology or fashion trends. These two topics have this type of power because they directly connect to some of the most sensitive and important developmental needs for adolescents: social connections, entering adult society, self-expression, and personal freedom. Some of the connected or underlying topics for these issues are identity, sexuality, social power and hierarchy, gender equity, and discrimination. These issues, the developmental needs of adolescents, and the power American society gives to clothes and technology make it a perfect recipe for becoming a “black hole issue.”

If the personal technology policy is not well established, consistent, and followed, then it is helpful for it to go through a whole community process to rewrite it. The whole community going through a process is important because all stakeholders need to be educated about the topic. Announcing the rewriting of the policy will draw people’s attention and bring stakeholders to the table. This is the opportunity to provide articles, books, other school’s policies, and other resources to educate everyone in the community about the topic. With the stakeholders reading similar outside information, it will help them approach the topic with more information and reduce the reactionary emotional responses.

Of all the stakeholder groups, the students are the most critical to get involved early and to educate about the topic. They will need time to read the information, discuss it with peers and teachers, and debate all the different elements of the policy. In the policy, all stakeholders need clear roles so they know how to support the policy, this especially includes parents. An effective policy should be written in simple and clear language and must account for different situations around campus. The policy must state the results of infractions to the policy and be in alignment with the school’s

3. “Black Hole Issues” are issues that will derail the entire community for a long time without a clear end, draw many people into them, and draw a large amount of energy from the community.

mission, vision, and values. As with any policy, consistency is critical for a norm to be established. The faculty will be the people to set the norms and guide students in following it. When writing a policy, it is most effective to name all of the devices, whether they be laptops, tablets, or handheld.

One relatively newer type of policy is the Bring Your Own Device (BYOD) policy. This policy allows and encourages students to bring and use their own laptop, tablet, or handheld computer instead of relying on the school to provide computers for each student. The issues around appropriate use of the device while in school remain the same.

Prepared Environments and Adolescent Needs

Most of the Montessori schools in the world are for children under the age of twelve, and most of those are for children between the ages of three and six years old. Since Montessori education is centrally concerned with creating respectful, healthy, and optimal developmental learning environments for children, it is not surprising that most Montessori trained teachers do not want digital tech-



Students use their own handheld computers (HCs) and computers provided by the school for academic work. This is an example of BYOD (Bring Your Own Device) in action.

nology in the learning environment. This is why most Montessori schools do not want digital technology in the learning environments. However, this opinion has changed more recently for older children. A growing number of upper elementary classrooms have several computers in the environment, so the nine- to twelve-year-olds can learn how to type, research, and create digital presentations of their work. The acceptance for using digital technology in the learning environment changes even more at the adolescent level because of the developmental needs and tendencies of the twelve- to eighteen-year-old person.

Before explaining all of the ways digital technology can help create a developmentally appropriate learning environment for adolescents, it is important to reaffirm some of the main principles of a prepared environment and the materials in it.

- Give the best materials to the youngest
- Beautiful and aesthetically pleasing
- Natural materials and natural light
- Ordered and sequential
- Introduced with a lesson or multiple lessons before use
- Materials assist in development and are not just to learn concepts or skills
- Only include the materials that are purposeful, necessary, and useful; nothing more
- Demonstrate and expect respect for materials and appropriate use of materials

These principles remain true at the adolescent level and are helpful guides when introducing materials to create a developmentally appropriate environment without Montessori albums or over a hundred years of practice to rely upon.

When thinking about materials in the environment, I usually start with what I learned in my Montessori primary training with Molly O'Shaughnessy, the director of training at the Montessori Training Center of Minnesota in St. Paul, MN. I remember the deep level of respect she showed every time she took a material from the shelf to present it to a student in training. Computers though are not just any material, they are special and, therefore, need special treatment and training. The material I continue to think about that was different and special, though not analogous to a computer, is the classroom bell. The classroom bell was such a special material that she presented it as a wrapped present for the classroom. Computers ought to be treated with that same type of care and respect, though the clear difference is that they are ubiquitous in society and, therefore, viewed by most all of us as pedestrian. The other difference is, as stated above, children grow up with computers all around them and observe others or use computers themselves mostly for entertainment.

A primary task for Montessori adolescent teachers and administrators is to work to create a culture of respect and care for the computers in the environment. One practice at the beginning of the year is to start the year without any computers and then slowly introduce them to the community. Two main benefits of this practice are it gives the students time to read and learn about how special these devices are through a quick story or study of computers. Reading articles about the history of computers, the effect of computers on the brain, and the educational applications of the computer will aid children in realizing that using computers at school is a privilege and not a right. Taking time to do this at the beginning of the year sets a clear tone and expectation that students respect and use computers appropriately.

After this baseline of respect is established, then teachers can begin to give students lessons on how to use computers to help them learn and express themselves in an educational setting. This is the most challenging aspect of using computers in school because when a twelve-year-old arrives for the first day of school, she has already observed and used a computer for easily 10,000 hours. What is more daunting is most of those hours were for watching videos, playing video games, watching movies and shows, and communicating

with friends. For this reason, young adults need regular instruction and practice at using computers and their applications for active learning and expressive purposes. Showing students how to use a computer and applications in the way adults use them for work in society is critical because they are interested in and working on how to be an adult in society.

The adolescents' developmental work of learning how to work in and be a member of society is what brought Dr. Montessori to the theory of the prepared environment for adolescents being on a farm. For some people, the idea of the farm being a place for young adults to be working with their hands to see tangible results of their skills and knowledge as a contribution to the adolescent community and in connection with the larger society, is the antithesis of digital technology. For this reason, some Montessori adolescent communities might be reticent to promote the use of digital technology. However, digital technology is part of the world, and young adults need to be prepared to use digital technology in order to be a contributing member of modern society.

We must be careful not to fall into the trap of overemphasizing specific technical skills that will completely change within ten years or just using digital technology for its own sake.... Experience with specific digital technology is important for adolescents, but it becomes more meaningful and powerful when it is for and with a community.

The Problem Is the Solution: Creating the Digital Farm

“The problem is the solution” is a common phrase and concept in permaculture practice. It is the idea that a person can use a problem to create a solution for that problem. Another way to think of the concept is using the negative to create something positive. Finding the solution within a problem is not a new idea. It is similar to the idea that within a problem lies an opportunity. The phrasing is a little different and more direct. If a school put this philosophy into practice around use of HCs in school, then the school would try to use digital technology, and even the students' own HCs, for learning and development.

Instead of banning HCs in the adolescent community, the solution is to work with the technology and guiding adolescents in the process of using the digital technology and applications to connect with each other and society through real and meaningful work on the farm.

Nearly every aspect of the prepared environment of the farm could be enhanced with digital technology, and the adolescents are the perfect group to do that work. The media calls young adults *digital natives* because they grew up in a digital society, so using digital devices is second nature to them. However, young adults still need training and practice with the common digital applications for searching and identifying quality resources and creating documents, slideshow presentations, and spreadsheets (as in Microsoft Office and Google Drive). These applications are basic and fundamental to working in the adult society. Adolescents can also regularly use research skills and the digital applications for nearly all of the aspects of the farm (see below).

Digital applications can be implemented for managing the following areas of the farm:

- Animals
- Store
- Hospitality business
- Museum of machines
- Creative expressions
- Physical expressions
- Intellectual work to inform the manual work
- Modern agriculture
- Self-expression—music, language, art
- Psychic development—moral, math, language
- Preparation for adult life—earth and living things, human progress and building up, history of human kind

For each of the areas listed above, there are specific digital skills and applications used to improve the quality or speed of the work for that task. Dr. Montessori did not propose to stay stagnant and just continue to use old technologies; she was a revolutionary scientist and physician. She states, “For in our times science has created a new world in which the whole of humanity is joined together by a universal scientific culture. Thus, children should learn to use machines habitually as part of their education” (*From Childhood to Adolescence* 125)

One vital part of the farm that digital technology cannot improve is silence and space. Adolescents need time to think and rest their minds, especially these days with all of the continuous input and information people receive. Most young adults will say they love having all of the access, information, and connection their HCs give them. However, if the norm at a school or on the farm is taking time to just sit in nature, listen to the world, and allow the mind to be quiet with itself, the students will love it. The young men or women who talk a lot often tend to appreciate the opportunity and restriction to be silent the most. It is all right, and even necessary, for school staff to apply extra restrictions for HCs and other devices in situations where the goal is for students to have direct, in-person social interaction or time for silent reflection.

When thinking about the farm prepared environment and the adolescent community, most Montessori teachers, administrators, and trainers think about twelve- to fifteen-year-old students. This is because most Montessori adolescent communities represent only two or three ages of the entire third plane of development. Younger adolescents can learn to manage the handheld technology, but it is much more difficult because of the strength of the social drive. The powerful social drive partnered with owning a new device (most people get their first HC when they are between eleven and fourteen years old) causes younger adolescents to have greater challenges with managing their time and using their HCs only for educational purposes at school.

However, it is the second half of the plane that is the period of consolidation and where the mature power of the age resides. Older adolescents tend to be able to manage their devices more effectively.

They can take real ownership of aspects of the farm and the adolescent community, completing work at an adult level with little or no adult assistance. For these older students, who are preparing for university and for life in the adult society, they need opportunities to work with current digital tools and applications. They also need to be able to work with skilled professionals who are working in the fields in which the students are interested in working.



These photos show the transformation of the front of The Grove School Farm Store. The work was completed by two seniors at Grove for their Senior Project. They asked for input from the school community with an online survey, then used a digital application to plan the mural in 1x1 foot squares for precise and detailed work. They also used a time lapse photography application on their handheld computer to take pictures of their work from beginning to end in order to show the change over time for their final presentation. These older adolescents did this project with little to no help or assistance from adults.

Actions to Build Community with Adolescents in the Digital Age

A genuine community builds itself over time and through experiences together. When people use HCs and other devices they tend to become less aware of their immediate environment and the other people within it. Without directions or restrictions, many adolescents, like many adults, will lose themselves in their HCs for long stretches of time.

The machine is like an extra adaptable limb of modern man; it is the slave of civilization. But beware, for the man of ill-will may be rendered dangerous by machinery; his influence may become unlimited as the speed of communication increases. Therefore a new morality, individual and social, must be our chief consideration in this new world. This morality must give us new ideas about good and evil, and the responsibilities towards humanity that individuals incur when they assume powers so much greater than those with which they are naturally endowed. (*From Childhood to Adolescence* 125-126)

So how can these devices help to build community? The first step is to establish a community vision for digital technology at school that supports the mission, vision, and values of the school. This process in itself helps to build community through a shared process, learning new information, and working through some difficult topics together with all stakeholders. If school leadership runs an effective and respectful process to establish or review the technology policy, then the community will bond during the process, even if there is disagreement.

Along with the policy, it is important that students have formal instruction and guided experience with computers such as:

- Typing - a necessary skill, but often neglected
- History
- Basic structure and functions (science behind the machine)
- Respectful and responsible use for emails, social media, etc. (“netiquette”)

- Safety and security
- Hardware basics and solving basic problems
- How to back up data
- How to search, find, and choose quality applications
- Microsoft Office or Google Drive applications
- Digital calendars for planning and to help with executive functioning

Another step is to develop opportunities for students, especially older adolescents, to learn higher-level computer skills from teachers and outside experts. Below are suggested areas of studies.

- Arts
 - Digital animation, 3D printing, 3D design software
 - Theater technology with lights, sounds, and effects
 - Digital music recording studio
 - Digital photography and videography for the school's yearbook and communications
 - Digital designs for creating beautiful spaces at school or in the community (e.g., murals)
- Communication
 - Students can assist the communications committee or staff at the school with communicating with adolescent students and parents through social media, weekly emails, monthly newsletters, and website design.



An older adolescent creates a digital animation on a tablet from her hand drawn sketches as part of an intensive week long study.



Above is a snapshot of the digital animation video the student created. It starts with a plant growing, a leaf from the plant changes into a butterfly, then the butterfly goes on an adventure. The student was so proud of her work, which she will include in her resume.

- STEM
 - FIRST Robotics (<http://www.firstinspires.org>) for ninth through twelfth grade students and Lego League for fourth through eighth grade students. Great River School⁴, under the direction of Michael Flood, has fielded a FIRST Robotics team for the past ten years. The competition focuses on students learning basic construction to build the robot and computer programming and coding to control the robot. Teams are required to have professional experts and businesses as sponsors. Besides learning technical skills to complete the tasks, FIRST Robotics helps students practice and refine their skills in teamwork, cooperation, planning, communication, self-confidence and leadership. It is a great example of how digital technology, under the right structure and direction, can build connections between young people and create a stronger community within a school.
 - Computer programming and coding
 - Student technology club that handles minor issues with school computers and printers with an IT staff member as the advisor
- Business
 - Students learn how to use accounting software like QuickBooks, as well as create websites and use social media to advertise the farm store, hospitality business, farmers market, or any other business that students create through the school.
- Social Science
 - GIS mapping software helps students collect data for analysis and create maps that tell history through story maps. This software allows students

4. Great River School is a Montessori charter school in St. Paul MN serving students in grades 1-12. In 2015, *US News* recognized it as the #1 high school in Minnesota.

to identify community issues that relate to global issues and produce maps that communicate the data to help improve their communities.

- Woodworking
 - Students could use SketchUp from Google for projects. It is relatively simple and has nice on-line tutorials.

All of these specific examples have a community connection and purpose that is beyond the importance of any individual learning a technical skill. Learning technical skills is rewarding and satisfying, but the skills become more dynamic, rich, and meaningful when a person uses them to help a community. Once the students have become proficient in certain skills, they can then take those skills into the adult society in an internship, job, or as a gift of service towards others in the community.



Students use ArcGIS mapping software from ESRI (Environmental System Research Institute) for a service project for the Wildlands Conservancy in California. Students worked with GIS experts to learn how to use the software while doing service.



Students work together and have a social connection through the use of technology.

Accept and Use the Revolution but Stick to the Montessori Principles

Digital technology, such as handheld computers, is different from any other tool. It has revolutionized the entire way the world functions, and educators cannot just expect adolescents to turn off and not use digital technology when in school. Montessori adolescent communities have the responsibility of preparing students for life in the digital adult society, while at the same time helping young adults learn and practice flexibility, adaptability, and problem solving. The world is different now and it will continue to be different in the future. We must be careful not to fall into the trap of overemphasizing specific technical skills that will completely change within ten years or just using digital technology for its own sake. Hardly anyone was using Google Drive five years ago and now it is a standard for most schools and many businesses, just like PowerPoint or Word before it. Experience with specific digital technology is important for adolescents, but it becomes more meaningful and powerful when it is for and with a community.

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