Adolescent Montessori Student's Attitude toward the Influence of Technology on their Individual Community Relationships

By: Lauren Lund

A Master's Paper
Submitted in Partial Fulfillment of
The Requirements for the
Degree of Master of Science in Education- Montessori

Advisor's Signature

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Abstract

Technology is growing rapidly in education. While many students enjoy using technology on their own, there is a constant push for using technology in the classroom. This study was designed to examine adolescent beliefs regarding technology in a Montessori classroom community. Students were asked to report their initial beliefs regarding technology use in the classroom. They were then presented with a variety of fictional and nonfictional texts that portrayed technology in communities in which they were able to participate in open-ended question based discussions that aimed to discover if technology helps or hinders communities. After the discussions, students were asked again about their beliefs of technology use in the classroom. Student surveys, student responses to written questions, recorded seminars, and teacher observations were collected as evidence. Results showed that students were able to acknowledge how technology can be helpful and rewarding when used correctly, but were also aware that technology can be a distraction from learning and could have a negative impact on relationships within a community. However, the students’ ability to formally give reasoning to the benefits and disadvantages of technology became stronger and more clear after the four Socratic seminars. In addition to students’ competence in supporting their formal opinions, this adolescent Montessori classroom became a stronger community due to their responsibility in contributing to one another’s learning.
Introduction

Technology use among teens is higher than ever with no likelihood of changing or slowing down. Adolescents in Montessori settings are expected to become proficient with the tools of their society - which for many students, includes becoming adept at using multiple technology tools, devices and applications. Montessori adolescents are also taught to value and contribute to their communities. However, the adolescents’ use of technology seems to be at odds with their ability to value and contribute in healthy ways to their community.

Literature Review

Technology in the Classroom

**Benefits of technology use in the classroom.** Maria Montessori recognized the benefits for students use of technology. Technology is an integral tool for schools across the world to assist in student learning. Today student work can be safely published as the final step in the writing process; students can use different websites such as “Kahoot” and “Quizlet” to help study and review content; and students can collaborate on group work through programs like “Google Docs” and “Blackboard.” Although focusing on farm equipment and other machinery, Montessori wrote about her beliefs in the benefits of technological advances, “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”
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(Montessori, 2007, p 78). Her belief was that students should have access to technology for the sake of learning and living in an ever-changing world.

By 2007, technology use in higher education had become unavoidable (D'Angelo & Woosley, 2007). “Technology in the Classroom: Friend or Foe” examined technological tools such as a chalkboard or whiteboard, powerpoint, overhead projectors, and use of videos. These tools were placed into three scales of teaching. Modern Technology (powerpoint and videos/programs) was said to have a greater impact on student learning over both the traditional style (chalkboard and overhead projectors) (D'Angelo & Woosley, 2007, p. 467) and the techno style (blackboard, group work via blackboard, and online course activities). The modern technology, powerpoint and videos, provided “structure to and clarification of material” (D'Angelo & Woosley, 2007, p. 467).

Another tool that has been used in classrooms and requires the engagement of students is connected classroom technology, “also known variously as audience response systems or classroom response systems” (Shirley & Irving, 2015, p. 57). In a study on formative assessment, researchers Shirley & Irving (2015) collected data from four different science classrooms to better understand the impact of connected classroom technology. Their findings suggested that gathering formative assessment data with the use of technology assists teachers in responding quicker to the instructional needs of their students, resulting in an increase student understanding and achievement. While Shirley & Irving’s research highlight positives in using technology to assist with pedagogical choices for lessons, they also indicated that students needed
time to learn the operating systems before data could be collected. Although Shirley & Irving’s research did not address Montessori education, their finding bolsters Montessori’s belief of following the child, “[teachers] observe the children in order to discover their needs and interests based on their stages in self-formation and their individual personalities” (Lillard, 1996, p. 22). If a teacher is able to gather and analyze information of both the individual student and the whole class, she is able to act on the data by reteaching a certain concept, challenging students to think deeper on a topic, or continuing on in the curriculum.

In addition to technological tools, Loertscher (2011) argues in his article titled “Unleash the Power of Technology in Education” the importance of collaboration between students and their peers as well as students and their teachers. Montessori was also one who recognized that in the adolescent period of life students are at a sensitive point during which the social part of their being is created (Montessori, 2007, p. 63). During this sensitive period, the collaboration amongst peers and teachers is extremely beneficial to learning. Montessori believed “that the capacity of really understanding is connected with discussion, with criticism, or with the assent of others. The satisfaction of knowing must be immediately communicated to others, and in this communications enthusiasm increases. … Spontaneous collaboration in all manifestations of life is a fact that has come as a true revelation (Montessori, 2007, p. 88). Loertscher contends that technology can maximize learning and that the schools that are making the most progress with technology and learning have “a grand alliance between tech directors, teacher librarians, teacher technologists, classroom teachers,
and, most importantly, the students” (2011, p. 47). He also draws attention to the common core standards emphasis on “learning to read and write in the context of doing research” (2011, p. 47) as well as learning to publish findings on either the school’s own private website or a public blog. By learning with technology and sharing knowledge and information with community, learning becomes easy and engaging.

Disadvantages of technology use in the classroom. While there are advantages to utilizing technology in the classroom, technology can also create various disadvantages. One example of the disadvantages of technology explained by Clarke and Zagarell (2012) is the difficulties schools, administrations, and teachers have implementing different aspects of technology as well as how to link technology usage with the present standardized education system. They discussed that while it is important to have technology, schools first need to decide which pieces of technological equipment to provide for the students and teachers as well as come up with funding to purchase the devices. Once purchased, teachers need to be trained to use the devices in order to supplement instruction to benefit the student. Clarke and Zagarell (2012) also discuss the role of the teacher in implementing curriculum via technology:

The expectation remains that teachers are responsible for enhancing their teaching methodology by all means, particularly in technology. ...While teachers need to adapt to technology, the problems go far deeper than teachers alone. ...The resistance is not about using ICT (information and communications technology) in classrooms and lessons; it is a response to many shortcomings
with the education system’s implementation and subsequent requirements. (p. 137)

In other words, teachers are asked to better engage students through the use of technology so that the student can better perform on the standardized test.

A second example of a disadvantage to technology in the classroom specific to Montessori education is the use of applications or “apps” in place of a didactic material. In the article “If iPad will iTouch Tablets: Montessori in an Ever-Changing Future” (2014), Epstein speaks on the Montessori didactic materials explaining that these materials “provide a concrete representation of an idea, and the idea is understood through tactile and other sensory exploration,” (p. 5) as shown in his observations of a five-year-old student:

A five-year-old declared he knew all about the 100 Board because he has that app on his tablet. When using the real 100 Board in the classroom, however, he could go no further than 30 because, he said, “the iPad always resets at the third row.” He had at home, in other words, the unpaid app version of the 100 Board. (p. 6)

So while technology has the ability to support learning, (in this case it supported the child get to 30 on the 100 Board) it also can encourage students to become pleased with his or her success without realizing there may be more to discover. Had the full version of this app been available to the student, he could have been successful in counting all the way to 100 and the app could be used as a support when the actual material is unavailable. However, the absence of didactic material itself and the whole
kinesthetic process of the material (seeing empty squares that need number tiles, using
fine motor skills to put the number tile in the correct square, and touching the squares or
boxes to count) limits the child’s learning and takes away from Montessori practices.

In addition to schools’ struggling to adopt and maintain technology and pressures
on educators to teach to the test, technology has shifted ways in which we focus our
attention. After studying people’s relationships with technology for thirty years, Sherry
Turkle, a sociologist, clinical psychologist and professor at MIT, has discussed how
technology affects three types of relationships. She uses a quote from *Walden* by Henry
David Thoreau at the top of her contents page to set up her findings on the different
relationships, “I had three chairs in my house; one for solitude, two for friendship, three
for society.” These chairs represent three relationships: first, the relationship people
have with themselves (solitude and self-reflection), next the relationships people have
with loved ones (family, friendship, and romance), and lastly the relationships people
have with others in society (work and education). Central to this action research was the
third chair, or technology’s effects on societal or classroom relationships. Turkle
acknowledged that technology has done and continues to do great things for
professional atmospheres; she also argued that technology can be a hinderance, “…so
much money, time, and effort has been spent to bring together these students, this
professor, these educational resources. And yet here [college classrooms], like
everywhere, if we have a device in our hands, we want to multitask” (Turkle, 2015, p.
213). Are people spending more time engaged in their devices than actually engaged in
a lesson, lecture, or conversation? Montessori characterized adolescents as having
“difficulty concentrating, ‘a state of expectation, a tendency toward creative work and a need for the strengthening of self-confidence’ (Lillard, 2005, p. 254). Turkle continued discussing the impact technology has on primary and secondary education, “Children who begin school with an iPad won’t know that you can ‘force’ a state of greater concentration by using media that allow you to do only one thing at a time. It’s up to a more experienced generation to teach them” (Turkle, 2015, p. 217). Even in the 1900s “Dr. Montessori believed that deep concentration was essential for helping children develop their best selves, and that deep concentration in children comes about through working with their hands” (Lillard, 2008, p. 20). While technology has an obvious benefit for the work and learning environments, students may not be putting in their full attention into the task they set out to complete, students may be distracted from their task by other technological temptations, and students may not communicate or collaborate as well with peers because they are ‘plugged in.’
Research Questions

Research Question:
What are adolescent beliefs regarding technology in a Montessori classroom community?

Subsidiary Questions:

1. How do Montessori adolescents define community? Do they value community?
2. How does technology affect Montessori adolescent’s communities?
3. What technologies are being utilized in Montessori adolescent settings and why?
4. Which technologies promote and which detract from community and collaboration?

Research Design and Methodology

Participants and Setting

Participants in this action research were 7th and 8th grade male and female students who were enrolled in an adolescent Montessori program from December 2016 to February 2017. The students are 12-14 years old. They are 91% white and 9% black. This particular group of students has 9% of the population in SpEd for learning disabilities and 14% on 504 plans for specific health, anxiety, or ADD/ADHD issues.

A 1:1 technology initiative at this particular school began in the fall of 2015 when the school raised funds and was able to provide one Chromebook for every two
students. In the fall of 2016, the school was able to have a Chromebook for each student enrolled in the middle years classroom. The chromebooks are available to students upon their request or when directed to bring to class for a specific lesson. The school does not allow students to use their personal devices: cell phones, tablets, laptops, or e-readers at school. However, when this population of students is at school, they have access to the internet through a school provided Chromebook. With the chromebooks, these students have access to their own personal Google school account in which they can access different applications provided by Google. Students have access to shared folders which provides them not only with documents from teachers, but allows for collaboration on different documents shared by other students. Students have access to Google forms which has been used by students to collect data for their science fair projects and to participate in formative assessments given by teachers. Another application students use regularly is Google slides. When students want to request to check out their assigned chromebook, they ask the teacher whose assignment they intend to work on whether or not they can use their Chromebook.

Procedure and Materials

Seminar. This study set out to discover Montessori adolescent’s opinion through Socratic seminar about how technology helps or hinders their relationships within the communities to which they belong. A Socratic seminar, also known as a Paideia seminar, is a formal discussion held by students, inspired by open-ended questions,
and designed to facilitate creative and critical answers related to a specific text (Bijoch, 2015, p.4). Seminars are used in Montessori adolescent programs because it brings it brings the students together as a community. Montessori believed that students need to work together, to collaborate, in order to learn about the society in which they belong. While students prepare for seminar individually by reading, annotating, and preparing answers to the open-ended discussion questions, their personal responsibility contributes to the overall community of learning within an adolescent Montessori classroom. By participating Socratic seminars, students are able to exercise responsibility for their learning and support and contribute to the learning of their peers. In seminars, learning doesn’t happen in isolation, students become responsible for each other’s learning.

In order to obtain students’ informed and prepared opinions, they were asked to participate in four different Socratic seminars. For each seminar, students prepared in three parts. First, students are asked to read the seminar text. They then go back and annotate what they felt was important “because seminars require reasoning, projecting, and imagining, students gather and analyze information before they construct ideas” (Tredway, 1995, p.27). Once students are done with their annotations, they are asked to write answers to open ended discussion questions prepared by the teacher. Before taking part in the seminar, students must have all their preparatory work completed and with them which confirms that all participants are ready to gain a deeper understanding of the seminar text at hand by engaging both socially and intellectually with peers. In this school’s middle years classroom, teachers set deadlines for the completion of
seminar preparation to ensure that the Socratic seminar can be held within a reasonable time frame of initially receiving the seminar text. The four seminar texts, which will be discussed in more detail below, were chosen to encourage students who already have a positive perception of technology to think deeply about their beliefs of technology specifically the ways in which technology can help or hinder their feelings of belonging within certain communities to which they ascribe.

To go along with the four texts, students were given seminar questions (Appendices A-D). The questions consist of reflection question options, an opening question, several grouped open ended discussion questions, and a final closing or whip around question. The questions for each text can be found in the appendix. The purpose of the reflection question is to get students to think about the text from a personal point of view, and they usually have two to three options to choose from. Once students finish the reflection question, they are led into the text with an opening question. The opening question cites a controversial idea in the text or presents students with an opportunity to begin developing an opinion; the opening question is what begins the Socratic seminar. After students answer that question, they have open ended discussion questions to answer. The students write out their answers to each of the discussion questions and cite textual evidence in their answer to make their opinions stronger during the actual seminar. Even though the teacher assigns the text and comes up with questions, the prepared students are able to direct the seminar in any way they deem fit. For example, the teacher will ask for a student to read the opening question. That student is allowed to answer that question or they can call on
another student to answer that question. Once the answers to the opening question begin to seem redundant to the students or the discussion sparks conversation on another topic, they can either pose another question and move on with their seminar. Finally, either after the discussion has been exhausted or time has run out, the whip around or closing question is posed. This is a simple question that each student at the seminar table is required to answer. For the purpose of these seminars, the closing question for each seminar was a variation of “Does technology help or hinder relationships/communities?” and students were allowed to answer “help,” “hinder,” or “both.” By answering this question, students were able to close the seminar with their opinion being heard.

This study took a month and a half to implement. Figure 1 is a weekly breakdown of the surveys, lessons, work time, and seminars that took place during the study. The intention was to have a seminar a week with the text and questions given on Monday and hold the Socratic seminar on Friday. However, being located in the midwest there were scattered school delays and closings due to weather.

| Pre- Seminar Preparation | -Technology Use Survey (December 16)  
|                          | -Students listened to “There will come Soft Rains.” (December 16)  
|                          | -Discussion and assignment on the future impact of technology on communities. (December 19, 21/22)  
|                          | -Technology Belief Survey (December 21/22)  
| Winter Break             | No assignments for students (December 23- January 2)  
| Seminar 1               | - “Appendix B” text and guided notes received (January 4/5)  
|                         | -Mandatory state testing (Jan 6)  
|                         | -Guided notes due (Jan 9)  
|                         | -Source citation lesson for history day and science fair (Jan 11/12)  
|                         | -Socratic seminar held on Friday (Jan 13)  

| Seminar 2                                      | -“The Veldt” given to students (Jan 13)  
|                                              | - Seminar questions received (Jan 16)  
|                                              | - Questions and annotations due (Jan 18/19)  
|                                              | - teacher workshop day -no school (Jan 20)  
|                                              | - seminar on “The Veldt” (Jan 23)  
| Seminar 3                                     | - “The Fun They Had” text received (Jan 25/26)  
|                                              | - Seminar questions received (Jan 27)  
|                                              | - Early release for students -no language lesson (Jan 30)  
|                                              | - Questions and annotations due (Feb 1/2)  
|                                              | - seminar on “The Fun They Had” (Feb 3)  
| Seminar 4                                     | - received and began “Education: Attentional Disarray” (Feb 3)  
|                                              | - questions received (Feb 7)  
|                                              | - seminar held (Feb 13)  

**Figure 1: Procedural Breakdown of Seminars and Preparation**

**Pre-Seminar Preparation**

Prior to reading selected writings or taking part in seminars, students were introduced to the topic by first taking a teacher created Technology Use Survey (Appendix E) and listening to “There Will Come Soft Rains” by Ray Bradbury. The survey and Bradbury’s piece were intended to hook the students interest in reading and discussing technology in their own lives. The Technology Use Survey was intended to gauge how many students have access to internet at home, how many devices or computers are present in students’ lives, who has limitations when using technology, and how much time students spend on their devices. The purpose of this survey was to spark personal reflection regarding the technology use in their own lives.

After taking the Technology Use Survey, students listened to Ray Bradbury’s story “There Will Come Soft Rains,” which is a post apocalyptic story is about an
automated home that continues to try to support its inhabitants long after they are dead and gone. The story is set after some sort of nuclear explosion that killed off the family who inhabited a smart home that did and is still trying to do everything for its’ inhabitants. Bradbury’s “There Will Come Soft Rains” and the survey sparked a conversation in each of the three lesson groups after the conversation, students were asked to define community and make predictions regarding how technology will affect communities.

**Seminar Text Selection and Reasoning**

In order for this study regarding the influence of technology on students’ relationships to be completed, certain materials were needed. First, students were asked to complete a belief survey (Appendix D) to determine students access to, use of, and feelings about technology within their classroom. Students took this belief survey both before and after the four seminars.

Next, seminar texts were intentionally selected due to their potential to disrupt students thoughts on technology access and use, as well as to show the effect technology has on relationships. The first text given to students was Maria Montessori’s non-fiction “Appendix B” from her work entitled *From Childhood to Adolescence: The Montessori Series*. This piece was chosen to show students Montessori’s beliefs of an adolescent program and technology, and to help students compare the text to their personal experience in an adolescent Montessori program. “Appendix B” is Montessori’s Erdkinder essay in which Montessori discusses topics ranging from a student’s diet in the section on moral and physical care to how a machine should be like an “adaptable
limb” (Montessori, 2007, p. 76-78). “Appendix B” essentially outlines and defines the important components of an adolescent community, and in the case of this action research, invited adolescent-aged students to consider how Montessori’s 70-year old thoughts on adolescence apply in the twenty first century. For example, Montessori advocated for a farm based boarding school during a time when family-owned farms and small scale agricultural production was the norm. Such an idea seems harder to adapt today amidst the vast array of educational standards, required learner accommodations and liability concerns that would arise with 13-18 year-olds engaging in long days of manual work. However, Montessori called upon the necessity of incorporating technology and machinery in the adolescent learning environment for the adolescent to explore. The Erdkinder Essay was selected as a text for students to explore as it provided an overarching explanation of a Montessori adolescent program, to compare their Montessori adolescent program with the original idea, and to take a glimpse into Montessori’s own thoughts regarding technology in an adolescent learning environment.

The second text, “The Veldt” by Ray Bradbury, was chosen to show students the effect technology can have on communities. Bradbury’s fictional story was originally published in 1950, and was written in response to televisions becoming more commonplace amongst American families as a prediction of what the future may hold. Just like in Bradbury’s story, American families have become increasingly more connected and attached to technology such as televisions, computers, tablets, and cell phones. In the story, technology had a negative effect on face to face conversation,
“Peter looked at his shoes. He never looked at his father any more, nor at his mother” (Bradbury, p.7). Bradbury’s story is an example of how technology can pose challenges on familial communities.

After reading Bradbury’s prediction of the impact technology could have on families, students were introduced to another piece of fiction, Isaac Asimov’s text “The Fun They Had.” Asimov published this text in 1951 as his prediction of the future of schools in the year 2155. In the story, the students, Margie and Tommy, have robotic teachers and paperless classrooms. The component of Asimov’s piece that is most relevant to this action research is the idea that the Margie ultimately comes to believe that a classroom full of her peers would have been much more fun than learning alone with a robot teacher. She is missing the relationships she imagines students of the past must have had at school with both peers and teachers.

The last text students are given is another excerpt of non-fiction. This piece is a selection from Sherry Turkle’s *Reclaiming Conversation* book titled “Education: Attentional Disarray.” This text was chosen to show the adolescent students that even a just a few years ago, high school and college students have had difficulty putting their devices away in order to concentrate better on one task, give others the attention they deserve, and to delve deeper in their learning. Turkle explains that the ability to multitask is a myth, “our performance degrades with each new task we add to the mix” (Turkle, 2015, p. 213).
Data Analysis and Results

Student Definition and Value of a Community

Since the research set out to discover the adolescent beliefs of technology in a Montessori classroom community, it was necessary to have students define what makes a community and how much value they place in their idea of community. Before students were introduced to the seminar texts, they were able to define community in their own words. Their collective definition of community was “a group of people who share similar beliefs, experiences, or locations.” Although the students had a list of about twenty or more different communities in which they all belong, this definition included community groups like their classroom, school, families, town, extracurricular groups, and religious groups. While the idea of their specific classroom community did not formally present itself in any of the four Socratic seminars, students were also able to rate on a likert-type scale their value of classroom community. Figures two and three show that these adolescents value community within their classroom.

![Figure 2: Pre-Seminar Response to the importance of classroom community](image)

![Figure 3: Post-seminar responses to the importance of community.](image)
When listing the communities they belonged to, some students included youtube and gaming communities which sparked a conversation on if communities need to be able to meet and talk face to face. They concluded that communities do not need to be face to face, but a majority of students responded with high ratings to the importance of face-to-face communication at school in the belief survey they took before and after the seminars as shown in figure 4. All students were given the option to comment after they selected their answers; one student who agreed both times to the survey statement “I prefer to communicate through emails or chat instead of face-to-face conversations wrote in his explanation to his response, “it depends on what the topic is. [For example,] if you want to send a link then you should use technology, but if it’s not [a] business type [communication], than face-to-face is good.” Another student who went from agreeing with the statement to choosing to be neutral about it explained her choices, “I think that emails and texting is just as effective as face-to-face [conversations], but face-to-face [conversations] can get across a point better because of the emotion in the voice.
Having face to face conversational skills is very important because it prepares us for later in life where we will have to converse with other people.” One student who stayed firm in her disagreement with the statement stated, “I like to go and hang out with friends rather than talk over the phone or through email. It's more fun and enjoyable.” In addition to the students’ opinions on communicating face-to-face, one topic of discussion in seminar focused on how technology has allowed people to communicate face-to-face when they may be too far away to meet in person. Even though a few students did prefer emails or chatting through technology, most want to build relationships and community in person.

**Student Opinions of Technology Accessibility**

Prior to gauging their opinions regarding how technology affects the communities in which they belong, students were asked about their use of technology outside of school in order to encourage students in thinking about their time spent on technology prior to seminar discussions. Of the students who responded to a questionnaire, 97% reported having internet at home and of those same students 88% have access to technology at home. However, this does not mean that the 12% who said they don’t have access at home don’t have access at all. Of the 12% that reported not having access to technology at home, 75% have their own email other than a school email and half of them are on some sort of social media.

Given that students read texts that deterred the readers from technology or suggested technology could harm relationships, students seemed to be more sure that
all students should have access to technology in their classroom. One of the first questions students were asked in the “Technology in the Classroom Belief Survey” was if “technology should be accessible to all students in the classroom.” Figure 5 represents the student opinions prior to seminar, and figure 6 represents student opinions after all four seminars. Prior to seminar, about 65% of the students were in favor of having access to technology; this percentage grew to 83% after all four seminars. In correlation with the number growing, the students’ reasoning as to why students should have access to technology became stronger. One seventh grade student, Student A, who responded “agree” to both surveys stated before seminar that, “Technology helps with assignments and gets the job done quicker. Plus, I don’t think I can survive without my awesome Spotify playlists.” However after seminars, the same student comments, “Classrooms don’t need technology. They use technology to make assignments more efficient, but technology can cause problems and classrooms can become dependent on technology.” It is unclear if the problems she is referring to are
relationships, technology errors, or students not using technology appropriately as all of these topics were discussed in the four seminars. Student B, an eighth grade student, changed her answer from “agree” to “strongly agree” after the seminars, but her reasons behind her answers were very similar stating that technology at school allows students access to a wider range of information and allows people to do research more efficiently.

In the first seminar on Montessori’s “Erdkinder Essay,” students discussed Montessori’s philosophy of freedom within limits as it relates to the chromebooks in their classroom. (The school does not allow students to take their assigned chromebook home, but does have policies and procedures in place regarding their usage in school.) One student started her group’s seminar by stating, “if there were no rules, we wouldn’t get any work done.” As this particular discussion continued, students agreed that this philosophy applied to them giving each other the examples of some of the limits in place: screens need to face the middle of the classroom; certain websites are blocked; if a chromebook is used improperly, it gets taken away. Students also said that the limits in place should be accompanied with each individual student’s moral code; the limits are there, as one student put it, “to help guide us so that we can feel comfortable to do things on our own.”

A couple students commented on both Montessori’s freedom within limits philosophy and her belief that “adolescents [should be treated] as if [they] had greater value than [they] actually show than as if [they] had less and let [them] feel that [their] merits and self-respect are disregarded” (Montessori, 2007, p72-73). In regards to the
limits in place for student chromebooks, one student stated, “it’s not that they don’t trust us, [the rules] guide us onto the right track.” In agreement with this, a student in a different seminar commented that “having my chromebook at school is a big deal. I feel like the teachers trust me.” The conversation of treating adolescents at a higher value in all three groups ended with the idea that students should live up to the value that is shown to them because teachers are showing them respect and trust.

**Technology Utilization in Adolescent Communities**

**Time Spent Using Technology as an Adolescent.** In the first survey, students were asked to report on how many hours both in and out of school per day they were on devices. Devices was clarified for students to mean any type of technological equipment with a screen that can access internet, help in communication with others, or is used for recreation. Some examples of a device would be a tablet (iPad, Nook, Kindle), cell
phone, computer, and video games. It is relevant to know students’ general use of technology outside of the classroom before they enter into discussions regarding technology use in different communities since the seminars discussed familial communities, peer communities, and school communities. Figure 7 shows a breakdown of daily adolescent technology utilization.

Out of the 35 students who took the survey, three students or 8.8% of the students reported spending no time on their devices because they don’t have a device that belongs to just themselves. Of those three students, one does not have internet and two report having time limits on shared devices. The other students report having their own devices and spend anywhere from less than an hour to over ten hours.

One question students were asked was if they needed to get permission from their parent(s) or guardian(s) before using their own personal device; only 5 of the 18 (28%) students who report using their devices anywhere from a few minutes up to four hours need to ask permission to use their device. However, 7 of the 18 (38%) report having time limits, and 11 of the 18 (61%) report having rules as to when they can or cannot use their own devices. When looking at the twelve students (35.4% of the class) who use their personal devices anywhere from four hours to ten or more hours in a day, there was a significantly different response regarding permission and limits. Only 1 student of the 12 in this grouping reported having time limits, yet reported using a personal device for 7-8 hours a day. Three of the 12 said they only sometimes needed to ask permission before using a personal device, and 2 have rules in place as to when they can or cannot use their own personal devices.
**Student Perspectives on the Impact of Technology.**

A majority of students in this classroom see the benefits of classroom technology and even technology as a whole. However, after reading the texts provided for seminars, students were able to acknowledge both the benefits and the hindrances of technology in their communities.

In their seminars on Montessori’s “Erdkinder Essay,” students pointed out and discussed Montessori’s statement that, “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” (Montessori, 2007, p. 78). Two different students in two different seminar groups shared that they received cellular phones at a young age after their parents divorced so that they could talk to either one of their parents when they needed or wanted. One stated, “I can tell I’m a different person; it’s depressing that [a phone] has made my life different. I can’t get away from it (social media and texting).” The other student who received her phone in first grade asserted, “I hated when [my phone] would get taken away. I would be so mad [at my mom]; I didn’t even want her around.” The same student later went as far as to say, “I’m addicted to my phone.”

When discussing the text “The Veldt,” students were able to discuss some of the multitudes of benefits technology has offered. Some of their examples included medical advances, everyday conveniences, and quick access to information. However, they all moved on to discuss how technology can impact lives in a negative way. When
discussing how the children in the story plot to kill their parents, they were asked if technology could be used to hurt people, and they responded almost in unison to affirm the question. Cyberbullying was an example that was used as an example in all three seminar groups. One student discussed how technology gives people the courage “to say mean things that they wouldn’t necessarily say face-to-face.” Another topic brought up during the seminars on “The Veldt” was in regards to war, “I also think of like war tactics and weapons that people are inventing and creating and improving.” In response to this comment, one student mentioned nuclear bombs and another student continued by saying, “somewhere down the road any country could use nucs that wipe out entire countries at the press of a button to create another world war.” Students agreed that technology should continue to advance, but that it shouldn’t advance negatively.

Another discussion, more related to classroom technology, was had in the seminars on Turkle’s “Education: Attentional Disarray” when students discussed technology as a distraction. One student talks about how when she is working at home her focus goes back and forth between her actual work and “random things” on the internet. Another student responds to her story:

I would like to add on to that because I kinda do like the same thing. Whenever I work, you know, I listen to music, and I usually use Youtube to do it. I’ll pull up some music that I want to listen to and put it on loop for a while. Then I’ll find out that one of my subscriptions has put out a new video and I’m like, “oh no. OH NO!” And then I’ll watch it and then I’ll find another one to watch. It will be an hour later and I’d have gotten nothing done. That’s just what happens to me.
In a different seminar group a student discusses how adolescents are curious and that having a chromebook is overwhelmingly tempting, "like for me when I’m doing my current science [assignments], I find one thing. Well that links me to another thing, then I go to the next thing and all of a sudden I am getting overwhelmed with things I want to do my current science on. By the time class is done, I have like twenty tabs open and I haven’t actually started my current science. Other students talked about being distracted exploring ideas, looking at pictures, and checking social media- even though it’s not allowed.

Limitations to Research

Students were able to become more self-aware of their use of technology in their personal communities and within their adolescent Montessori classroom community, but it is important to identify the limitations to this action research. One limitation is the communities in which the students belong. They are all from the same school and similar neighborhoods. These neighborhoods have generally similar economic circumstances. For the most part, these adolescents have very safe communities in the same upper midwest rural community which strives to educate parents and adolescents on social media safety.

Another limitation that impacted this action research was the largely homogenous make-up, grouping and attendance of students throughout the two month study. This adolescent classroom consists of 36 students who are dominantly white and who
encounter limited, identified learning challenges. Had this group of students been more diverse, the study may have had different results.

Additionally, students involved in this action research were split into smaller groups of 12 for their classes or lessons. Every quarter, students are put into new groups. This means that in the middle of this study, the student lesson groups were changed. Changing lesson groups meant seminar groups were also changed. This presents a limitation because students may not have been as comfortable sharing their thoughts and ideas in seminar as groups changed.

Also, the student need for the teacher’s assistance would qualify as a limitation. Not only was this a study conducted by the teacher, but it was also incorporated into the student curriculum and assessment. So, on one hand, the teacher was interested in each student’s unadulterated opinion, but also eager to see each student succeed. As with other assignments, if a student was falling behind the teacher would pull the student aside in order to assist with reading or assignment completion. In this assistance, it would be difficult to keep voice intonations and examples neutral of all opinion. Similarly if students needed help and sought out the teacher to help clarify the seminar questions, the student could have picked up on the teacher’s opinion based on the examples used for clarification and used that as their own opinion.

Finally, with this being such a long action research study, it was inevitable that students would be absent at one point or another. Some students missed the preparatory work of either listening to “There Will Come Soft Rains” by Ray Bradbury or creating their futuristic technologically impacted community, and some students missed
both. During the time of the four seminars, some students were out of school due to illness, some eighth graders went to shadow at local high schools, and one student went on a two week vacation. While a student’s attendance may not affect their progress of reading, annotating, or answering the seminar questions, if he or she missed the actual seminar, his or her thoughts and opinions were not heard by their lesson group and the absence of the student and his or her opinions could change the dynamic of their group’s seminar.

**Future Action Plan**

One aspect of the belief survey, the survey students took before and after all four seminars, that wasn’t discussed in seminars, but may add value to the technology in our classroom was the open-ended statement, “technology can improve our…” after which students were able to select routines, skills, and work they thought could finish the statement. Options listed are: community meetings, lessons/learning, work time, time management, self-expression, preparation for adulthood, homework completion, organization, and Socratic seminar. While all of the items were checked by one student or another, it would be interesting to hear how they believe technology could improve these things. For example, since students have 1:1 technology, if they had only assignments that were on their chromebooks, would work completion improve? If students set timers on their chromebooks to indicate the allotted time they could give themselves to complete an assignment or task, would their time management improve?
How would technology improve community meetings? Finding out students’ thoughts on this particular statement would be interesting.

Students were asked in the Technology Use Survey if they used or were active on social media. One idea for the future of this topic would be to analyze the difference in regards to work completion and level of work completion between students who are and are not on social media. It may be interesting to see if those who don’t have social media complete their work at a higher level than those who are active on social media.

Discussion/ Conclusion

After looking at survey results and student answers to seminar questions, this community of learners was able to recognize as a group throughout the seminar process the benefits and drawbacks that technology has on Montessori adolescent communities. Regarding technology, these students value the 1:1 technology they have and that they appreciate the responsibility that having a school device entails. This Montessori adolescent community prefers face-to-face learning, but also acknowledge that there are benefits of being able to communicate and collaborate via school Google accounts. Even though they were able to admit that technology occasionally gets them off track or causes distractions for them, they enjoy the different opportunities chromebooks provide for the classroom: variety in presentations, personal music for concentration, collaboration in shared documents, quick information, inspiration for ideas. They understand that there are limits for the freedoms that the chromebooks in
their classroom provides for them, and they are aware that technology can both help and hinder relationships in their communities.

While the focus of this action research was to discover Montessori adolescent beliefs about technology in the Montessori classroom, the findings went much deeper than the research and subsidiary questions due to the study being conducted through seminar. Socratic seminar is three things: structured though assigned work, procedure and expectations; self-guided as students are able to reflect on their own opinions and direct the seminar in a certain direction; and open-ended because the conversation rarely stops once the seminar has come to a formal close. Learning does not happen in isolation and these adolescents became responsible for each other and their learning. Adolescents, as Montessori believed, are intellectual and social creatures. By being part of seminar, the students become convergent in nature and their discourse becomes an element of community building and learning opportunities.
References


Appendix

Appendix A: Seminar Questions for “Appendix B: Study and Work Plans” by Maria Montessori

Name: ______________________ 

Technology in the Adolescent Montessori Community 
Seminar #1: “Appendix B: Study and Work Plans” From Childhood to Adolescence by Maria Montessori

DIRECTIONS: Please answer the questions with complete sentences on a separate sheet of paper. Reference the text with page numbers.

Reflection Question: (choose 1)

Appendix B is what Montessori believed a Montessori middle school should be. 
- Write about some ways Bluffview does what Montessori wanted middle schools to do. 
- Write about how some of her ideas are not feasible today. 
- Write about what Bluffview could do to be more like Montessori’s vision.

Opening Question

- A big topic on page 73 is freedom within limits. Montessori believes that “rules give the necessary guidance” and are put in place to “maintain order and ensure progress.” How does this idea relate to how people in general use technology? How does this idea relate to how Bluffview and the Erdkinder classroom uses technology?

Core Questions (Directions: Read all of the questions before you begin. You must answer in complete sentences and support your answers by using information from the text and page numbers).

1. Montessori suggests that teachers treat adolescents with greater value than the student actual shows.
   - Why would this be helpful to the adolescent? 
   - Is it important to you? Why?
   - How can this relate to 1:1 technology or chromebooks in the classroom?

2. Montessori discusses “freedom within limits” on page 73. How could or how does this relate to technology and adolescent (or you)?

3. Montessori states that self expression opportunities “would involve artistic and linguistic ability and imagination” (75).
   - What is self expression to you?
   - Has technology hindered or improved our (childrens, teens, adults) imagination?
   - How does or can technology improve or contribute to self expression? How does or can technology hinder to destroy self expression?
4. Towards the end of Appendix B, Montessori discusses education to prepare for adult life (76-78).
   a. Although she talks about taking machines apart and putting them together again, which you might do with your pens or mechanical pencils, how else might a “museum of machinery” be part of our community?
   b. Montessori wants adolescents to “use machines habitually as a part of their education” (78). How do we as Erdkinder meet her standard?
   c. Why might Montessori suggested that men (or women) could be dangerous because of machinery? Is this still something that could be present in 2017?
   d. How do you think Montessori feels about the growth of technology?

Closing Question
- Does technology in Erdkinder help or hinder the community or relationships within the classroom?
Appendix B: Seminar Questions for “The Veldt” by Ray Bradbury

Name: __________________

Technology in the Adolescent Montessori Community
Seminar #2: “The Veldt” by Ray Bradbury

DIRECTIONS: Please answer the questions with complete sentences on a separate sheet of paper. Reference the text with page numbers.

Reflection Question: (choose 1)
- What technology do you enjoy having around? Why?
- Do you believe technology has a positive or negative impact on family relationships? Why?

Opening Question:
"Peter looked at his shoes. He never looked at his father any more, nor at his mother" (Bradbury 6). Why is this quote important? What does it suggest about Peter?

Core Questions:
1. “The Veldt” was published in 1951. It offers a view of what Bradbury predicted family life and technology would be like around the year 2000. (Answer all.)
   a. Is it an accurate view? Why or why not?
   b. What predictions are correct? Incorrect?
   c. What does he leave out?
   d. What argument is the author making about technology? Do you agree or disagree with Bradbury’s argument?
2. There are plenty of internal and external conflicts in “The Veldt.” First, make a list of the conflicts, then see if you can come up with the cause of the conflict. Are these conflicts or could these conflicts be something that happens in present day?
3. Our theme is “zooming in” on technology for the next few seminars. (Answer both.)
   a. What message or moral is Ray Bradbury trying to send his readers about technology? Give two to three examples from the story to support this theme.
   b. What is the author trying to say about family? Give two to three examples from the story to support this theme.

Closing Question
- Does technology help or hinder relationships within a family/ close group?
Appendix C: Seminar Questions for “The Fun They Had” by Isaac Asimov

Name: ________________

Technology in the Adolescent Montessori Community
Seminar #3: “The Fun They Had” by Isaac Asimov

DIRECTIONS: Please answer the questions with complete sentences on a separate sheet of paper. Reference the text with page numbers.

Reflection Question: (choose 1)
- What would be some of the pros and cons of having a teacher like the one Margie has?
- Do you believe technology will take the jobs of teachers?
  - If yes, explain. How do you believe it would be similar or different from the story?
  - If no, explain. How do you envision the future of schools and technology?

Opening Question:
In lines 9-15 Asimov is describing how Margie and Tommy, “They turned the pages, which were yellow and crinkly, and it was awfully funny to read the words that stood still instead of moving the way they did when they were supposed to—on a screen, you know. And then, when they turned back to the page before, it has the same words on it that it had when they read it the first time.”
Keeping in mind, the setting of the story is 140 years in our future answer both questions:
- How does this idea relate to the technology of today?
- What are the similarities in this idea relating to Bluffview and the Erdkinder classroom using technology?

Core Questions:
2. “I wouldn’t throw it away” (lines 18-20)
   - Who says this?
   - Why is this said?
   - What does the word “it” refer to?
   - What is “it” being compared with?
3. Describe the two kinds of teachers in the story.
   - What are some ways the idea of the two different teachers connect with Montessori’s “Appendix B” and/or “The Veldt”?
4. Describe the two kinds of schools in the story.
   - What are Margie and Tommy’s views of their school and the school from the book?
   - How do you think technology will or could change schools in the next 150 years?
   - Will the change (that you imagine) of technology in schools be beneficial or malignant?
   - What are some ways the idea of the two different schools connect with Montessori’s “Appendix B” and/or “The Veldt”?

**Closing Question**
- Does technology help or hinder relationships within an educational community?
Appendix D: Seminar Questions for “Education: Attentional Disarray” by Sherry Turkle

Name: __________________

Technology in the Adolescent Montessori Community
Seminar #4: “Education: Attentional Disarray” from Reclaiming Conversation by Sherry Turkle

DIRECTIONS: Please answer the questions with complete sentences on a separate sheet of paper. Reference the text with page numbers.

Reflection Question:
- Write about a time when you multitasked and discuss the process and end results of what you were doing.
  - For example: trying to complete a paper while talking with a friend
    ● Process: typing words from the conversation, forgetting what the conversation was about
    ● End result: having to stop talking to your friend OR not finishing the assignment/ making a lot of errors on the assignment.

Opening Question:
On page 213, Turkle states, “A lot is at stake in attention. Where we put it is not only how we decide what we will learn; it is how we show what we value.”
- Where is your attention when you are at home, at school, or with friends. How does this show what you value?

Core Questions:
1. Do agree or disagree with the statement “Where we put it is not only how we decide what we will learn; it is how we show what we value” (213)? Explain with specific reasons why you agree or disagree.
2. Although you may not have your own personal device, we all have a chromebook we can use in the classroom.
   a. What are the temptations technology presents either in the classroom or in your personal life? (pg 212)
   b. Do you lose focus when you see that other students are not focused? (p215: “Studies show that when students are in class multitasking on laptops, everyone around them learns less.”)
3. One question we explored with “Appendix B” dealt with technology and imagination. In this text, a student claims that “We have the awesome new power to erase boredom.” (214).
   a. First, what were your thoughts on imagination and technology?
   b. Do you agree or disagree with this student’s statement? EXPLAIN.
   c. What are some things you do or think to do when you are bored?
4. Does technology help or hinder relationships in educational communities? Explain.
5. Make a chart like this one on your answer sheet and fill in the blanks by comparing or contrasting what you believe are the main ideas in each text.

Closing Question
Does technology help or hinder an individual's education?
Appendix E: Technology Belief Survey

Technology in the Classroom Belief Survey
* Required

1. Email address *

2. Technology should be accessible to all students in the classroom. *
   Mark only one oval.
   - Strongly Disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly Agree

3. explanation of answer (if you want to explain)

4. Each student should have their own device in the classroom. (A computer provided to the student.) *
   Mark only one oval.
   - Strongly Dissagree
   - Disagree
   - Neutral
   - Agree
   - Strongly Agree

5. explanation of answer (if you want to explain)
6. I feel that when I use technology I tend to multitask. *
   Mark only one oval.
   - Strongly Disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly Agree

7. explanation of answer (if you want to explain)
   
   
   

8. I prefer to communicate through emails or chats instead of face to face conversations. *
   Mark only one oval.
   - Strongly Disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly Agree

9. explanation of answer (if you want to explain)
   
   
   

10. How important is face to face communication at school? *
    Mark only one oval.
    
    1 2 3 4 5
    Not Important  Extremely Important
11. I want my teachers to do video lessons so that I can learn at my own pace. *
   Mark only one oval.
   - [ ] Strongly Disagree
   - [ ] Disagree
   - [ ] Neutral
   - [ ] Agree
   - [ ] Strongly Agree

12. explanation of answer (if you want to explain)

13. I believe that having technology makes our classroom a better community. *
   Mark only one oval.
   - [ ] Strongly Disagree
   - [ ] Disagree
   - [ ] Neutral
   - [ ] Agree
   - [ ] Strongly Agree

14. explanation of answer (if you want to explain)

15. How important is classroom community to you? *
   Mark only one oval.

   |   |   |   |   |   |
   -------------------
   Not Important      |   |   |   |   | Extremely Important
16. Technology could improve our... *

Check all that apply.

☐ community meetings
☐ lessons/learning
☐ work time
☐ time management
☐ self expression
☐ preparation for adulthood
☐ homework completion
☐ organization
☐ Socratic Seminar (not the preparation)

17. explanation of answer (if you want to explain)