CHARACTERISTICS OF MODERN MONTESSORI

by

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Characteristics of Modern Montessori

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Abstract

CHARACTERISTICS OF MODERN MONTESSORI
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The Montessori method of education has been practiced and discussed for over a century. However, it has not been accepted into the mainstream of American education. One challenge to the adoption of Montessori philosophy and techniques is a lack of empirical research and method of measuring programs for fidelity and outcomes. The purpose of this project was to create a rubric for Montessori primary classrooms to assess program fidelity from the perspective of one of the largest Montessori accrediting organizations in the United States. The rubric includes structural, instructional, and physical materials observable in Montessori classrooms. The rubric was created based on the American Montessori Society (AMS) perspective of the Montessori method and Maria Montessori’s own works. Five (N=5) individuals, currently involved in Montessori education with varied perspectives, evaluated and provided input on the rubric. Their comments were considered in the creation of the final rubric as authentication and grounding of the document as valid for the modern Montessori classroom. This final version of the
rubric serves as a potential method of evaluating modern Montessori classrooms, following the AMS interpretation of Dr. Montessori’s philosophy.
Chapter 1: Introduction

Developed over a century ago, the Montessori theory of child development and curriculum for education may hold answers to current questions about how to foster more autonomous, intrinsically motivated learning in classrooms (Bagby et al., 2012; Besancon & Lubart, 2008; Lillard, 2012; Marcon, 1999; Rule & Kyle, 2009). Developed as a method of educating the "whole child" (Powell, 2001), the Montessori method reverses the control structure of a traditional classroom. For example, children in Montessori classrooms independently select their "work" within specified boundaries. Instead of addressing the students as a group, teachers typically give children lessons individually, or at most in small groups. This way, instruction is inherently differentiated for each student (Lillard, 2005).

When Dr. Maria Montessori first began giving lectures and presentations about her philosophy and method, she called her work “scientific pedagogy” (Montessori, 1912). Because she based her theories on lengthy research and careful development of materials, she insisted that only programs she personally sanctioned could be considered true Montessori programs. However, she did not take steps to trademark or otherwise protect the name (Standing, 2008). In 1929, Dr. Montessori established the Association Montessori Internationale, to help
disperse and oversee the implementation of her work (Association Montessori Internationale, 2012). However, as her ideas spread with news of superior outcomes for her students, other groups began to develop teaching methods using Dr. Montessori’s basic principles. Nancy McCormick Rambusch founded the American Montessori Society in 1960, with the specific goal of presenting a modified version of Montessori, designed to better fit American society (American Montessori Society, 2013b). Though the AMS mission is a purposeful modification of Dr. Montessori’s original philosophy, research has shown that not all school or classroom level modifications are intentional, nor made with the same goals in mind (Daoust, 2004; Yen & Ispa, 2000). As time has passed without mandatory regulation or oversight, it is possible that some of what now exists under the Montessori label has evolved away from Dr. Montessori’s original method.

The Montessori philosophy and method are not well supported by a sound body of empirical evidence (Isaacs, 2012; Schapiro, 1993; Torrence, 2012). Instead, the value and positive outcomes of Montessori practice are promoted by self report or case studies, conflicting quantitative studies or word-of-mouth communication and anecdotal evidence (Damore, 2004; Ervin, Wash, & Mecca, 2010; Rule & Kyle, 2009; Tatsch, 2011). What research has been conducted is scarce and may contain methodological limitations (Bagby & Jones, 2010; Bagby & Sulak, 2011; Dohrmann et al., 2007; Lillard, 2005).

Those who are familiar with the Montessori method of instruction continue to tell wonderful stories about superior outcomes for Montessori students and ways
in which Montessori theories align with current research (Gebhardt-Steele, 2003; Kahn, 2003; Torrence, 2012). However, these outcomes and connections are not well supported by empirical evidence (Lillard, 2005). Dr. Montessori’s original method does not use tests or other traditional means of assessing students’ abilities or student achievement. Students are grouped into mixed-age classrooms spanning three-year age ranges. For these reasons, among others, there is no easy or traditional way to measure Montessori students’ learning outcomes. For example, a single pencil and paper test could not be used for all students of the same age or class level because each student’s learning is individualized. Absent traditional forms of assessment, it is challenging to draw comparisons between Montessori programs themselves or between Montessori based programs and others (Lillard & Else-Quest, 2006; Lillard, 2005). Such comparisons are necessary to support the claims that the Montessori method is a valuable and effective form of education.

The absence of a clear understanding and support for Montessori theory and its practice contributes to public confusion and misunderstanding (Murray, 2012). This misunderstanding is perpetuated by articles such as the one recently published anonymously in The Economist, entitled “Montessori Management: The Backlash Against Running Firms Like Progressive Schools Has Begun” (2013). This article begins with misinformation about the Montessori method and continues to tie these misconceptions to others, resulting in an article that negatively portrays several ideas. Fortunately for Montessori practitioners and supporters, The Economist later printed a letter to the editor from Joyce Pickering, then president of AMS, in defense
of Montessori practices. However, the inaccuracies of the original article demonstrate the misinformation that could be avoided with better understanding of Montessori theory generally.

To be able to make comparisons between Montessori programs and to compare Montessori programs to non-Montessori programs, researchers need a better understanding of Montessori theory and practice itself (Isaacs, 2012; Lillard, 2011; Schapiro, 1993). More research is required to understand how the Montessori theory looks when translated into practice in modern classrooms, and then what constitutes “best practice.” As I will explain, the unregulated nature of the Montessori label has resulted in wide variations in implementation of the original methods. This project was an investigation of current AMS Montessori praxis - how Montessori philosophy is enacted in modern AMS classrooms - to develop a rubric of items and characteristics, which should be expected in Montessori primary classrooms.

Statement of the problem

For a method of education that has been practiced for over a century, Montessori theory is still not well known, researched, or understood (Lillard, 2005; Murray, 2008; Whitescarver & Cossentino, 2008). The cause for Montessori theory's seemingly permanent position on the sidelines of mainstream education reform remains a subject of debate amongst Montessori educators and those who have undertaken Montessori-related research (Donohue Shortridge, 2007; Mathews,
Some theories to explain why Montessori philosophy has not become more popular include public misconceptions about the method (Murray, 2008), and lack of quantitative evidence of the outcomes for students (Berger, 1969; Damore, 2004; Lillard & Else-Quest, 2006). A first step to remedy the situation for future Montessori-related research requires agreement on a definition of Montessori practice.

To begin a proper investigation of Montessori, as a method and philosophy, researchers and Montessori practitioners alike will need to agree upon at least a general description of Montessori practice. Existing research has shown that significant differences exist in the implementation of Montessori theory (Daoust, 2004). Some researchers intentionally study the differences in implementation of Montessori philosophy, while others uncover variations in fidelity to the original theory as a by-product of investigating multiple programs (Blank, 2009; Isaacs, 2012; Jacobson, 2007; Monson, 2006; Yen & Ispa, 2000). Program differences may be due to the varied training programs, perspectives of the schools, or individual teachers’ preferences. Or simply because the label Montessori is in the public domain, anyone can use the term and its use is not regulated. Several groups in the United States, each with their own perspective of Montessori philosophy and practice, offer affiliations and accreditations to teachers, training programs, and schools. However, practitioners are not required to affiliate themselves with any group. This variation in interpretation has led to confusion and challenges for the Montessori movement as a whole (Lillard, 2005; 2012; A. K. Murray, 2008;
Whitescarver & Cossentino, 2008). Studies comparing Montessori student outcomes to those from non-Montessori programs have produced mixed results. Some studies show that Montessori students outshine students of non-Montessori programs, while others found the Montessori method to be no better, or even worse than other programs in terms of student performance and outcomes (Bagby & Jones, 2010; Baines & Snortum, 1973; Berger, 1969; Bunnag, 2000; Carta, 1980). Further, these studies show that the programs labeled as “Montessori” vary in implementation (Daoust, 2004).

How can we draw conclusions about the value of a method of education if we have not yet reached a conclusion about what that method of education should look like? Before we can begin to compare Montessori theory, practice, or outcomes to anything, it must first be compared to itself, and a description of “best practice” must be formed. This way, the Montessori method can be analyzed on its own terms, by those who practice it and thus know and understand it best. Because implementation differences exist (Daoust, 2004), we need a way to measure each Montessori program to determine which other Montessori programs are suitable for comparison. For example, Dr. Montessori insisted that classrooms covering a three-year age span were ideal (Montessori, 1912). However, for a variety of reasons, not all modern Montessori classrooms adhere to that model (Monson, 2006). If a classroom serves only three- and four-year old students, is it comparable to classrooms that serve three-, four-, and five-year old students? Similarly, other tenets of Dr. Montessori’s original method are implemented in varying degrees in
classrooms today. Some of these variations in implementation are purposeful, based on particular groups’ perspectives of the original philosophy and method. There are many separate groups of Montessori practitioners who each maintain their own perspectives and praxis of Montessori. The goal of this study was to produce a rubric for evaluating Montessori classrooms to determine the degree of implementation from a single perspective of Dr. Montessori’s original ideas – namely that espoused by the American Montessori Society.

Need for the study

The term ‘Montessori’ is in the public domain. Though there are several organizations in the United States that offer affiliations and accreditations based on their own particular perspectives of Dr. Montessori’s original philosophy, there is no single regulatory body for the use of the term (American Montessori Society, 2013b; Association Montessori Internationale, 2012; Montessori Accreditation Council for Teacher Education, 1995; North American Montessori Teachers’ Association, 2014). Though these groups exist, affiliation (of individuals or schools) is not compulsory, and schools might either not seek accreditation or acknowledgement with any organization or become affiliated with multiple groups. This freedom of use of the Montessori label has led to variety in implementation. This variation presents a major challenge to anyone interested in studying or otherwise learning about Montessori theory or practice in the United States today.
Research has documented examples of the variation in implementation of Montessori theory in the 21st century. Some have discovered programmatic differences through investigation or observation of Montessori in particular (Jacobson, 2007; Lillard & Else-Quest, 2006; Lillard, 2011; Monson, 2006). Others have noted differences as a by-product of other research inquiries (Blank, 2009; Yen & Ispa, 2000). These programmatic differences must be addressed before Montessori praxis can be properly evaluated. Yen and Ispa (2000) cited the differences in implementations they observed across 10 Montessori programs as a recommendation for further research, concluding: “there is no standard guideline describing ‘best practice’ of Montessori education, and that makes the evaluation of Montessori classrooms very difficult” (p.182). Daoust (2004, p.12) stated, “assessing differences in Montessori early childhood education programs... would provide a more comprehensive view of the Montessori method as it currently exists in this country.” Whatever the cause for the lack of research and recognition of the Montessori method, a proper investigation will require a means of evaluating programs.

**Purpose of the Study**

This study aimed to investigate the possibility of producing a rubric of observable practices in Montessori classrooms. In particular, this list was based on the American Montessori Society’s minimum criteria for accreditation and teacher training program for primary classrooms, serving students aged three through six
years (American Montessori Society Office of School Accreditation, 2013). It includes some specific lessons and materials as well as observable behaviors, which should be evident in a high fidelity AMS Montessori primary environment.

Following Daoust’s (2004) work on classifying Montessori programs into subgroups, this study aimed to produce a rubric which could help to evaluate individual environments without the need to compare multiple classrooms or programs, effectively creating a set of minimum standards for AMS Montessori primary classrooms. Such a rubric will contribute to the general understanding of Montessori praxis in modern American classrooms.

The rubric was grounded in translations of Dr. Montessori’s original works, and materials from an AMS-accredited teacher training program as well as input from current professionals in the Montessori community. In particular, this study examined specific, basic characteristics, skills, or behaviors that are generally observable in Montessori classrooms today and could be considered “best practice” by Montessori practitioners.

**Definition of Terms**

**American Montessori Society (AMS):** Founded in 1960 by Nancy McCormick Rambusch, one of Dr. Montessori’s students, to promote a specifically American version of Montessori. Today, the AMS accredits and offers other affiliations for schools, teachers, and teacher training programs. The AMS produces national and regional conferences, resources for funding research as well as a national journal.
**Association Montessori Internationale (AMI):** Founded in 1929 by Dr. Montessori to aid the distribution and development of her ideas. “Recognized as the oldest authority on Montessori education worldwide” (Daoust, 2004, p. 15).

**Casa del Bambini:** The name of Dr. Montessori’s first schools in Rome. For clarity, this paper will use the English translation “Children’s House.”

**Dr. Montessori:** To differentiate between the person, Dr. Maria Montessori, and the idea/method of the same name, Dr. Montessori will be used to indicate the person. Dr. Maria Montessori was one of the first female physicians in Italy and developed her theories from her medical training, observations, and work with children.

**Montessori environment:** A learning environment – portion of a room, classroom, or building specifically prepared to facilitate the Montessori method, including materials and participant behaviors.

**Montessori materials:** Hands-on learning materials (called didactic materials by Dr. Montessori [1912]), originally designed and developed by Dr. Montessori for the education of children. May include materials designed by other trained Montessori teachers, which serve specific educational purposes.

**Montessori method:** The practice of Dr. Maria Montessori’s theories in a prepared environment for education. Originally based on Dr. Montessori’s observations and systematic development of learning materials for children with special needs in Italy, Dr. Montessori adapted the method for children of “normal” ability.
Montessori philosophy: The theories and principles developed by Dr. Maria Montessori, which provide the basis for her method, classroom practices and teacher training.

Montessori program: Any program of education that self-identifies as Montessori.

Montessori teacher: Dr. Montessori wished to make a distinction between traditional teachers and the adults trained in her methodology. As such, she often referred to Montessori teachers as classroom directors or directresses. For the purposes of this paper, I will refer to adult practitioners of Montessori as teachers and refer to them using female pronouns to more easily distinguish between teachers and students. Of course, there are male Montessori teachers as well as female Montessori students. It is simply easier to read he or she than read his/her or s/he whenever referring to generalized individuals.

Program fidelity: The degree to which a program implements the Montessori method either as originally conceived by Dr. Montessori or as espoused by the affiliated group.
Chapter 2: Literature Review

A brief history of Montessori

Maria Montessori graduated from the University of Rome School of Medicine in 1892. She was one of the first two female physicians in Italy (Foschi, 2008; Isaacs, 2012). She focused the following ten years on the health of the underserved citizens of Rome: women, children, and the poor. In her position as an assistant doctor at The Psychiatric Clinic of the University of Rome, Dr. Montessori was responsible for the care of children with special needs (Montessori, 1912). As she worked with and observed these children, she developed the hypothesis that a better curriculum of education would benefit these so-called “deficient” children more than medical treatments. Her belief stemmed partially from the work of others who were interested in special education, including Seguin (1866), who wrote about ‘pedagogical treatment’ for children and Itard (1962), who wrote about social education.

In 1898, Dr. Montessori gave a well-received lecture at the Pedagogical Congress of Turin about her ideas for educating children with special needs. As a result, she was asked to give a series of lectures which “developed into the State Orthophrenic School” (Montessori, 1912, p. 26). At this school, Dr. Montessori developed the beginnings of her future method and curriculum. She spent two
years working closely with children with varying disabilities and their teachers, developing methods specifically designed to help the children learn discrete tasks. Dr. Montessori created individual lessons and materials to teach the children basic self-care tasks, as a way of helping them gain independence (Standing, 2008). Because of the children’s varying abilities, she designed the materials to be used by one child at a time, so that the children could work as long as they desired. As the children mastered the self-care tasks, she began to experiment with lessons geared towards academic learning. She designed manipulatives so the children could continue to learn with their hands, but the activities led towards reading and writing. Eventually, she was able to teach some of the children to read and write well enough that they passed the state’s school examinations (Montessori, 1912).

Dr. Montessori’s success with the special needs children was considered “almost miraculous” (Montessori, 1912, p. 31) to the Italian public. However, while the rest of the nation marveled at her success, Dr. Montessori wondered what was wrong with the state’s educational methods so that her students, called “deficient,” could pass their tests. This curiosity led Dr. Montessori to begin working on a method of education for normal children. She enrolled in philosophy and experimental psychology classes to supplement her independent study of teaching methods. She also began teaching classes in Pedagogic Anthropology, encouraging teachers to experiment with their classrooms and to modify their methods based on their observations of their own students.
In 1906, Edoardo Talamo, a developer of low income housing in Rome, approached Dr. Montessori (Foschi, 2008). He asked her to oversee the creation of schoolrooms inside some of his buildings. These schoolrooms would serve the youngest children living in the housing projects. At the time, Italian public schooling was compulsory beginning at age six, leaving many young children with nowhere to go, and nothing to do while their parents were at work. Often left to their own devices during the day, these young children would vandalize the buildings and generally cause chaos (Isaacs, 2012; Montessori, 1912). Parents, weary at the end of a long day’s work, had little energy to put things right after the children had done their work. Mr. Talamo hoped that Dr. Montessori would be able to create a space where these children would be looked after, cared for, and also learn something, thus encouraging their parents to leave them in her care. Dr. Montessori’s first “Casa del Bambini” (Children’s House) was opened in January 1907, and child care there was complimentary to residents of the building (Montessori, 1912).

Because of a tight budget, Dr. Montessori furnished this first Casa del Bambini with donated items, including toys, office furniture, and household supplies. She and her small team of teachers altered the furnishings to better suit the size of the children and set up lessons with the household supplies to teach the children to take care of themselves and the environment. With many children and few adults, it was necessary to teach the children to help maintain the environment and also to become somewhat independent (Montessori, 1967).
The Children’s House was a success. The children’s parents were pleased to be able to leave their children in good care, and were pleasantly surprised at how capable their children became. As the children learned to take care of themselves and their surroundings, the general population of the building became more aware and conscientious of their surroundings as well. Dr. Montessori described the transformation: “they not only live in a house, but they know how to live, they know how to respect the house in which they live” (italics original, Montessori, 1912, p. 48).

The success of the first Children’s House led Mr. Talamo to request several more in other buildings. Each Children’s House replicated the methods and materials of the original, encouraging children towards independence and focusing on care for themselves and their environment.

Soon, the children were capable of managing the self-care and care of the environment tasks (Montessori, 1912). Dr. Montessori began to experiment further with the academic learning materials she had used previously with the special needs children in the psychiatric ward. At the time, the general belief was that young children were not ready for academic learning (Isaacs, 2012; Sobe, 2004).

Referencing her observations of the children in these Children’s Houses, Dr. Montessori began to devise materials to capitalize on what she perceived as the children’s interests. Rather than beginning with materials to teach reading and writing directly, she focused on materials that would help to sharpen the senses. She observed that the young children were often peculiarly interested in details – tiny objects, or slight differences between shades of colors (Montessori, 1912).
From this observation, she eventually developed a range of materials, now known in the Montessori curriculum as the “sensorial materials,” each set focusing on one of the five senses. Most of these materials involve sorting by comparison. There are color tablets, which vary slightly in shade, for children to grade. There are pairs of opaque containers filled with different objects for children to match by shaking and noting the variation in sounds. Some of these materials incorporated indirect teaching goals. For example, the Knobbed Cylinders are sets of cylinders, which fit into tailor-made apertures in a wooden block. To remove and replace the cylinders, Dr. Montessori had tiny round knobs affixed to the tops of the cylinders. This way, the children naturally used their first two fingers and thumb to handle the cylinders, strengthening the muscles they would eventually use to hold a pencil (Lillard, 2005).

As the older children progressed beyond the sensorial lessons, Dr. Montessori began to introduce materials designed more specifically to encourage writing and reading (Montessori, 1912). Here again, she wanted to simplify the process as much as possible while still allowing the children a hands-on experience of learning. To begin to teach letters, she and her teaching staff cut individual cursive letters out of fine sandpaper and glued them to cards. These sandpaper letters, a staple in the Montessori curriculum today, were the children’s first introduction to semiotics, making meaning from symbols (Driscoll, 2005), and allowed them to trace the shapes easily and repeatedly. Rather than introducing the letters by their names, she showed the children how to trace the letter in the way it is written, while slowly repeating the associated phonetic sound. Because Italian is
a phonetic language, once the sounds of the letters are learned, it is not difficult to string the sounds together to make words (Lillard, 2005). Eventually, Dr. Montessori began using the sandpaper letters with children as young as two or three years. The letters were large enough that the children could trace them easily, learning the shapes and associated sounds, without requiring the precision needed to write them.

Once the children were familiar with some of the letters and sounds, they could begin to create words with another material Dr. Montessori called the moveable alphabet. Her original version of the alphabet was composed of letters cut from cardboard. She painted the vowels red and the consonants blue to provide further differentiation, though she did not specifically explain this to the children. Four-year-old children could move the letters and create words based on the sounds they knew. Dr. Montessori described the process: “when the children grasp the principle that each sound of the spoken language can be represented by a symbol, they advance on their own” (Montessori, 1967, p. 218).

After the children learned all the sounds of the alphabet, writing and reading followed naturally. By the time they had learned all the sounds, they had already completed much of the foundational work for writing, from strengthening their muscles for manipulating a pencil to understanding the semiotics of language (Helper, 2014; Lillard, 2005; Montessori, 1912). In this way, Dr. Montessori and her team were able to prepare young children for the public schools in a way that
previously had not been thought possible. News of these educational successes spread throughout Italy, Europe and the world (Sobe, 2004; Standing, 2008).

**Montessori in the United States**

News of Dr. Montessori’s discoveries and successes reached the United States quickly. In 1911, S.S. McClure began to publish Dr. Montessori’s articles in his popular *McClure’s Magazine* (Donohue Shortridge, 2007; Tozier, 1912b) and Americans began to seek information about her methods in earnest. The U.S. Bureau of Education published booklets about the Montessori method, further increasing public interest (Smith, 1912). In December 1913, six years after the opening of the first Children’s House in Rome, Dr. Montessori made a three week speaking tour of the United States (Whitescarver & Cossentino, 2008). Influential people such as Alexander Graham and Mabel Bell, John Dewey, Helen Keller, and President Woodrow Wilson’s daughter, Margaret Woodrow Wilson, supported her visit and helped to generate interest in her work (Donohue Shortridge, 2007; Greene, 2005). Many books and articles on Dr. Montessori and her method were published, including several by the U.S. Bureau of Education describing the materials, method, and its benefits (Donohue Shortridge, 2007; Smith, 1912a; 1912b; Smith, 1913; Stevens, 1913; Tozier, 1912a).

As with anything that gains popularity quickly, the political climate and critics of Dr. Montessori’s work (Donohue Shortridge, 2007) were an equally strong force against the movement. One researcher in particular, William Heard Kilpatrick,
was particularly outspoken about his views against Montessori (Whitescarver & Cossentino, 2008). In fact, he did agree with certain aspects of Dr. Montessori’s method, but his general assessment was that the theory was based on outdated and unfounded theories (Kilpatrick, 1914). Kilpatrick visited Italy to observe some of Dr. Montessori’s work with children and spoke with her to better understand the method. However, during his trip, he noted children using materials for purposes other than their intended uses and felt that the method was not well suited for American children (Donohue Shortridge, 2007). Upon his return, Kilpatrick gave lectures and published his negative views about Montessori in a book as well as articles (Kilpatrick, 1913, 1914, 1915; Donohue Shortridge, 2007). Because of the frenzy around all things Montessori, this critique also spread quickly and managed to dampen interest as quickly as it was aroused. Dr. Montessori did not specifically respond to critiques of her method and views and thus Montessori was all but forgotten in the United States (Donohue Shortridge, 2007; Isaacs, 2012).

It was not until the 1950s that Montessori resurfaced in American education (Donohue Shortridge, 2007). Again, the climate was right for ideas that seemed radically different from tradition. Nancy McCormick Rambusch was primarily responsible for revitalizing interest in Montessori amongst the American public. While searching for “the best possible education” for her children, McCormick Rambusch “happened upon” Montessori, and soon became devoted to learning as much as she could about it (Povell, 2009, pp. 65–67). In 1929, Dr. Montessori had established the Association Montessori International (AMI) “to oversee the activities
of recognized schools and societies” (Daoust, 2004, p. 24). It was also accrediting and organizing teacher training programs across Europe. In the late 1950s, McCormick Rambusch travelled to Europe to take an AMI teacher training course (Daoust, 2004; Donahue, 2010). She returned to the United States as an AMI representative, focused on revitalizing the Montessori movement in America. She established teacher-training programs and dispersed information about the method to encourage interest by publishing articles (Povell, 2009; Rambusch, 1992). Eventually, she decided that if the Montessori method was to be successful in the United States, it would need to adapt to fit the American culture specifically (Donahue, 2010; Rambusch, 1992). In 1960, McCormick Rambusch founded the American Montessori Society, to train teachers and encourage the American Montessori movement. Though based on Dr. Montessori’s original work and philosophy, there are significant differences between the AMS and AMI. First, the AMS was not explicitly approved by the AMI. Second, the AMS is founded on the idea that modifications to Dr. Montessori’s original method may be necessary for parts of the method to be adopted in American schools. The AMI position included complete adoption of the method, including requiring all the materials originally used by Dr. Montessori. The AMS perspective of the Montessori method focuses on the particular community populations served by each Montessori environment. One of the first AMS accreditation criteria calls for schools to “establish a vision, educational goals, and philosophy in alignment with the school’s mission statement and appropriate to the needs of the school population” (American Montessori
Society Office of School Accreditation, 2013). This customized approach to the philosophy is intended to embrace the variety of social and cultural perspectives within American society. The AMS was interested in spreading acceptance of Montessori ideas and the AMS teacher-training programs advocated classroom-by-classroom modifications to best fit the specific social environment (Daoust, 2004; Donahue, 2010). Embracing classroom-specific modifications was theoretically similar to the experimentation Dr. Montessori encouraged in her Pedagogic Anthropology classes.

Since its founding, the AMS has developed a large network of Montessori teachers and affiliated programs in the United States (American Montessori Society, 2013a; Association Montessori Internationale USA, 2012). Daoust (2004) argues that the AMS has been successful in its attempt to spread interest in Montessori theory and practice because of the flexibility in its interpretation of Dr. Montessori’s original work. However, she also acknowledges that this flexibility may lead to inconsistency in implementation. “By approving any school meeting the minimum requirements of the AMS and not assuming the authority to take away affiliation, the organization encouraged a variety of interpretations of the method and may have recognized programs that implemented practices that were inconsistent with basic principles of the Montessori approach” (Daoust, 2004, p. 35). Thus, even schools accredited or affiliated with one of the largest Montessori organizations may vary. As discussed further below, to make sense of the variation and make Montessori education more accessible, we need to take a closer look at what is happening in
AMS Montessori classrooms today and what constitutes best practices. If researchers wish to make comparisons between classrooms and programs, there must be some type of evaluation method to ensure that only like AMS programs are studied. To start this process, a brief overview of the Montessori method is required.

**The Montessori method**

Based on her work with the children in the psychiatric ward, and then in the Children’s Houses, Dr. Montessori developed a comprehensive curriculum for the education of young children. She kept the focus on the children, believing that each child was the best person to determine his or her own learning path. She insisted that the children be allowed to make their own choices, within the reasonable limits of the environment. “Freedom within limits” and “follow the child” have become unofficial taglines for the modern American Montessori movement, though they originated with the work in the Children’s Houses of the early 20th century. In this section, I will provide descriptions of some of the main tenets of the Montessori method. Each is rooted in the work Dr. Montessori conducted and is based on her translated written works.

**Control of error.** At the core of Dr. Montessori’s philosophy was her belief that children develop themselves cognitively through their interactions with the environment (Montessori, 1936). These early constructivist (Feldman, 2010) views were based on her observations of children working with materials repeatedly, which she interpreted as the children constructing their own meaning and
understanding. Because she believed that only the child himself could generate his own understanding, she designed materials children could interact with and manipulate (please see defined terms, Montessori teacher). A common characteristic of Dr. Montessori’s materials is that they are self-correcting, meaning the child will see for himself if he has made a mistake. Thus, the materials themselves do the teaching.

We can revisit the previous examples of color tablets and sound cylinders here, to describe what Dr. Montessori called controls of error. Dr. Montessori’s original color tablets were pieces of heavyweight card with strips of silk wrapped around the centers. The first set contained two each of red, yellow, and blue. The teacher would demonstrate how to carefully remove the cards from their box, touching only the card edges, to prevent discoloration of the fabric, and randomly arrange the tablets on the workspace (typically a table top mat or floor mat). The task was simply to match the colors, and line up the pairs at the top of the mat. After a single demonstration, during which the child showed understanding of the proper use and procedure of the material, the child could return to complete the activity at his own discretion. Later sets of the color tablets contained seven gradations of each of nine colors. These tablets were to be arranged in order from lightest to darkest or vice versa. Again, once the teacher demonstrated the appropriate use of the materials, children were permitted to return to the activity at any time. If the
child made a mistake in pairing colors or putting the shades of colors in order, the error would be visually obvious and the child could make corrections on his own.

The sound cylinders control error in a manner similar to the first set of color tablets. Because there are pairs of cylinders, if the child makes a pairing mistake, he will notice that the final two cylinders do not sound alike. As the child completes the activity repeatedly, he will be able to notice the differences in sound more quickly.

Each of Dr. Montessori’s materials has a specific, direct purpose, such as recognizing subtle color variations. Each also has indirect purposes, which serve to prepare the child for future, more difficult, or abstract work. For the color tablets, these indirect purposes might include the development of concentration, for the young child to follow an activity through from beginning to end, coordination of both large and small muscle groups to prepare the workspace and handle the tablets carefully, and independence, to be able to complete the known task successfully without assistance.

**Teacher as guide.** Though the materials take on much of the actual teaching work, this does not mean that the teacher is left with little to do. On the contrary, the teacher is highly involved because she is responsible for preparing the children’s environment in a way that allows for a systematic provision of learning experiences (see definition of terms, Montessori teacher). Just as Dr. Montessori and her team in the first Children’s House made new materials for the children as they saw needs
arise, teachers in modern American Montessori environments often provide unique materials for children to learn and continue to be curious.

Dr. Montessori spent much of her time observing the children's behavior to assess their needs. In her lectures and work, she frequently encouraged teachers and other adults to carefully observe, without preconceptions. Because she wanted the children to learn to be independent, Dr. Montessori also expected her teachers to provide opportunities for the children to learn to be successful at tasks without intervention. She was specific in her directive that teachers attempt to reduce children's frustrations as much as possible. Necessary materials should be kept well stocked and accessible and the classroom should be tidy and well organized (Montessori, 1967). She insisted that a significant number of the primary level lessons – for children aged three- to six-years – be presented silently and without error (Montessori, 2009). This way, she hoped to reduce the number of distractions to success, providing the child a clear vision of the desired outcome. She felt that the child only needed to see what was expected and he would figure out how to get there on his own.

When Montessori teachers present materials, they explicitly model behaviors for successful completion of the task (Lillard, 2005b). For example, a teacher might notice a child struggle to serve himself snack in the Practical Life area and later create a tonging exercise to place on the shelf nearby. At a later opportunity, she will guide the child's attention to the tonging exercise. Her presentation of the material will include a methodical examination of the tongs, the receptacle
containing the objects to be transferred – perhaps pompoms, and the receptacle to receive the pompoms. Next, she will deliberately demonstrate the grip she will use to hold the tongs as well as the specific motions used to pick up a pompom and transfer it to the empty receptacle. Though this process may seem tedious to adult onlookers, it is an explicit means of demonstrating behaviors. At each step, the teacher demonstrates her self-reflection, checking her grip of the tongs and the tongs’ grip on the pompoms. At the conclusion of her work, when all the pompoms have been transferred, she will admire her work briefly and return the material to the shelf, inviting the student to have a try.

Essentially, Dr. Montessori wanted her teachers to behave like scientists, stating that “the teacher must not limit her action to observation, but must proceed to experiment” (Montessori, 1912, p. 88). She felt that teachers could not know or predict how or what a child would learn from any experience and thus must only guide each child towards an independent study of the environment, encouraging each to become successful members of their community.

**Freedom within limits.** Keeping the focus on the child as the “worker,” constructing his own understanding of the environment, materials in Montessori classrooms are provided on low, open shelves, accessible to all (Lillard, 2005a; Montessori, 1967). Children are free to independently choose their own work and work with materials as long as they please. Boundaries are in place based on what the child has learned to do. There is a proper way to use each material, and children
must have each material’s use presented to them (by teacher or peer) before it becomes available to them as a choice for work. In this way, each child in the Montessori classroom regulates his or her own learning process. He chooses a material to work with, observes and recalls the presentation, then attempts to mimic the presentation in order to master the skill. As part of the classroom community, the children are expected to replace materials back on the shelves ready for use by the next person. By setting up the environment in a tidy and orderly manner, the teacher sets the example.

Montessori environments typically serve a multi-age group of children. Dr. Montessori believed that this was better than the typical single age groupings in traditional grades or forms at school. She believed that the multi-age setting better mimics society and permits beneficial interactions between children. The youngest children benefit from seeing what the older children are able to accomplish, and are encouraged to work towards those ideals. Meanwhile, the older children learn to make accommodations and be helpful to their younger classmates, teaching important social skills (Montessori, 1936). This multi-age setup helps to reinforce boundaries because the children watch and support each other, learning appropriate behaviors.

A last note about limitations on freedom involves the control of error mentioned previously. This time, the control of error exists within the environment itself. When funds allowed, Dr. Montessori commissioned furniture for her classrooms. These child-sized furnishings were designed to be comfortable and
practical yet also light enough to be easily moved by the children. Dr. Montessori truly felt that the Children’s Houses belonged to the children and therefore everything within them should be centered on the needs of the children. Thus, she felt that the children should be able to move the furniture if they felt it was necessary. In her description of the furniture, she wrote:

Our little tables and our various types of chairs are all light and easily transported, and we permit the child to select the position he finds most comfortable. He can make himself comfortable as well as seat himself in his own place. And this freedom is not only an external sign of liberty, but also a means of education. If by an awkward movement a child upsets a chair, which falls noisily to the floor, he will have evident proof of his own incapacity; the same movement had it taken place amid stationary benches would have passed unnoticed by him. (italics original, Montessori, 1912, p. 69)

At the time, schoolroom furniture was often bolted to the floor or otherwise not easily moved by the children in the traditional schools. Dr. Montessori took even the furniture as an opportunity to teach children to learn to control themselves without adult intervention.

**Current research on Montessori practice**

Through its century-long history, relatively few scientific research studies have investigated actual Montessori practice (Lillard, 2005; Lloyd, 2008; Monson,
What literature does exist has focused on comparisons of Montessori outcomes with traditional educational outcomes (Bagby et al., 2012; Baines & Snortum, 1973; Dreyer & Rigler, 1969; Lillard, 2012; Lopata et al., 2005), investigated qualities of the Montessori materials (Lillard, 2008; 2011; McNeil & Uttal, 2009), or provided perspectives of Montessori as it relates to some other construct (Damore, 2004; Rule & Kyle, 2009; Soundy, 2003; Tatsch, 2011). From these, a portrait of what is possible in Montessori classrooms can be extrapolated. However, this portrait is based on untested assumptions and is therefore not reliable and cannot be generalized. The assumptions include the idea that the programs studied are examples of high fidelity Montessori practice, or that they are representative of Montessori programs generally. Furthermore, each study relies on its own definition of what constitutes Montessori, which presents challenges for making comparisons between studies or considering overall results.

Daoust (2004) investigated the differences in Montessori implementation in a 66 classroom sample. She identified some areas in which research has shown variation in Montessori implementation, such as: (1) supplementing or replacing traditional Montessori materials; (2) providing a long, uninterrupted work period; and (3) implementing mixed-age groupings spanning 3 years or more (p. 41). In the following sections, I will provide some examples of the implementation in variation in Montessori classrooms by comparing studies’ descriptions of the Montessori environments they investigated. Finally, I will provide examples evidencing the
American public’s confusion in understanding the Montessori philosophy and methods.

**Montessori material fidelity.** One of the easiest variations to identify is when programs use materials that are not part of the original Montessori method or that do not follow the philosophy of Montessori (Peters, 2009). Jacobson (2007) describes a public Montessori school that is mandated to use standardized tests to assess its students. The Montessori trained teachers must work against their Montessori training to comply with the state and federal regulations. They incorporate timed activities, worksheets and other practice “drills” to adequately prepare their students for assessments that are inherently foreign to the otherwise Montessori environment. The use of timed activities is also opposed to Dr. Montessori’s provision for children to be permitted to work at a task as long as they wish. In her classrooms, she observed children spending an extended period of time engaged with a single material or activity, and believed this work to be crucial for child development (Montessori, 1936). The worksheet and “drill” system conflicts with Dr. Montessori’s desire to allow students to understand concepts through experience, progressing from simple to complex and concrete to abstract (Montessori, 1912). In addition to involving non-Montessori materials, these students are also prevented from exhibiting freedom of choice when they are preparing for the tests.

**Instructional fidelity.** Following the occasional lack of autonomy in the case above, Yen and Ispa (2000) observed one Montessori program that discouraged
students from collaborating. This digression from Dr. Montessori’s practices prevents children from expressing their autonomy as well as undermining part of the purpose for multi-age groupings. One of the reasons Dr. Montessori organized her classrooms in multi-age groupings was to promote collaboration. She believed that the younger students could benefit from observing the older students and that the older students could benefit from assisting the younger ones. Furthermore, allowing collaboration amongst a wider age range of children strengthens the feeling of community (Montessori, 1936). Recent research has also shown that students do learn best when provided a peer model (Kitsantas, Zimmerman, & Cleary, 2000).

To accommodate state and federal mandates, many public school Montessori programs make instructional changes to Dr. Montessori’s method as well. Fagan (2013) studied a classroom where the teacher gave phoneme lessons as a group to save time. Traditionally, these lessons would involve Sandpaper Letters, originally cut from actual sandpaper by Dr. Montessori and her team. These letters would be presented individually to children, one-on-one while repeating the phonetic sound each letter represents while tracing the letter in the manner in which it is written (Montessori, 1967). There are a multitude of reasons for modern teachers to shift from individual lessons to group instruction. It would be interesting to study if this variation causes any difference in effectiveness.

**Structural Fidelity.** The Montessori method requires a long, uninterrupted work period. Dr. Montessori argued that children need a sufficiently long period of
time to complete their focused work, contributing to her insistence that they be allowed to work with materials as long as they please. She wanted the environment to reduce the number of distractions and frustrations to the children as much as possible (Montessori, 1912). However, Blank (2009) found that while some schools are able to provide a three-hour work period, others are not. She described one Montessori program that cannot provide the three-hour work period because of other obligations and regulations. The school was able to provide many other provisions for Montessori, but the teachers acknowledged the “frequent interruptions as a reality of public school life that negatively impacted their teaching” (2009, p. 256).

These implementation differences are representative examples from the existing research. Unfortunately, many articles do not provide rich descriptions of the Montessori programs studied that allow the reader to assess the implementation level. Instead, articles will reference the schools’ or teachers’ affiliations, assuming this signifies a standard definition of practice (Lopata et al., 2005; Rose, Jolley, & Charman, 2012; White, Yussen, & Docherty, 1976). These individual case studies are vital to the continued research on Montessori, and could only be enhanced by a more standard definition of the programs considered. Hojnoski and her colleagues (2008) provided a thorough summary of the Montessori program included in their research. They give examples of observed characteristics, including range of ages served, and descriptions of the space and décor, and briefly tied these observations to Dr. Montessori’s philosophy to create a
picture of the observed praxis. A generally accepted scale or measure of implementation fidelity would relieve researchers of the burden of providing such detailed descriptions, provide consistency and contribute to general understanding about Montessori praxis.

As Murray (2008) showed by surveying over 1,500 American adults, there is widespread misunderstanding and lack of knowledge about Montessori theory and practice. This lack of understanding contributes to the general confusion about what Montessori theory espouses, how it is practiced, and what can be expected in Montessori programs. Even in articles attempting to provide information about Montessori education, facts can be incorrect. Wardle (2009) claimed that "Montessori teachers are required to be certified from an official Montessori training" (p. 73). He also explains that "many schools that are not officially Montessori programs use the term to attract well-healed [sic] parents: there are many programs with the Montessori name that do not have the required approval and teacher credentials" (Wardle, 2009, p. 73). As stated above, because Montessori is not regulated, there are no certification, affiliation, or accreditation requirements for teachers or programs. While affiliating bodies do exist, association is entirely voluntary and frequently involve a lengthy accreditation or recognizing process. Furthermore, accreditation from any group may not convey standardization as might be expected from a regulated term. Between the conflicting, incorrect, and general lack of information, it is easy to see how Americans can be confused about the Montessori label. The goal of this project is to create a rubric for measuring
Montessori fidelity to contribute to the further research and understanding of current Montessori praxis.
Chapter 3: Methods

The goal of this project was to investigate the possibility of creating a rubric for identifying elements that might indicate Montessori best practices in the United States. Taking the perspective of the American Montessori Society, I investigated both Dr. Montessori’s original theories and methods as well as the ways in which they are enacted in classrooms today.

Participants

The sample group was composed of five American Montessori Society trained teachers with varying experiences working with Montessori. One is a master teacher who has experienced Montessori from the perspective of a student, teacher, parent, administrator, and teacher training program administrator, another has had almost 20 years’ experience in the field of Montessori education, and three classroom teachers, ranging from newly credentialed to several years experience. The variety of experience demonstrated was purposeful to contribute to a fuller picture of how Montessori praxis stands currently. Each participant was contacted and invited to participate (see Appendix A) by reviewing and making comments on an initial rubric for Montessori primary classroom environments. Participants were also invited to clarify their responses or ask questions in a follow up phone
interview, which was not recorded. This research project was submitted to the George Mason University Human Subjects Review Board for approval. The HSRB found the project to be exempt, thus participants were not required to sign an informed consent document (see Appendix B). All participants did agree to provide feedback on the rubric by responding to an initial participation request email.

Rubric Design and Development

The initial rubric was based on my own experience as a Montessori teacher, my AMS certified teacher training, published research about Montessori practice, and Dr. Montessori’s methods as stated in her translated works. Because the AMS was founded on the belief that a specifically American version of Montessori would be best suited for American children, there is significant flexibility in the AMS criteria for accreditation for Montessori programs. Thus, the perspectives of current AMS-certified Montessori teachers provide a necessary connection to current Montessori praxis.

The rubric is six pages and covers three general areas; (1) structural fidelity, (2) instructional fidelity, and (3) Montessori lesson fidelity. Each area contains subsections aimed at evaluating the classroom environment in objective and observable ways. Each item on the rubric is scored on a scale from zero to three, indicating no observations to highly evident, or easily observed. The rubric was designed to be completed over a minimum of a 30-minute observation period, not to last longer than three hours, based on the Montessori concept of three-hour work periods.
Scores from multiple observations could be averaged to provide a fuller picture of the classroom environment’s Montessori fidelity.

I shared my initial rubric (see Appendix C) with the ‘master’ teacher who has spent many years and held many roles in Montessori – as a teacher, parent of Montessori children, head of a Montessori school and officer of an AMS Montessori teacher certification program. The master teacher provided feedback and then I distributed it to a wider pool of Montessori practitioners.

Each of these Montessori professionals provided perspective from their own experiences working in the Montessori community. They are all graduates of AMS affiliated teacher training programs, contributing to a more focused perspective of Montessori practice. This focus on only AMS primary classrooms and teaching strategies will allow the rubric to be more effective for this particular type of classroom. Additional rubrics would be required for other perspectives, age groups, or group affiliations.

The goal of this project was to create a rubric, which could be used as a starting point for examining AMS primary Montessori classrooms. The participants’ feedback served as testimony from individuals currently involved in the Montessori community, with each participant providing a unique perspective. Thus the five participants’ opinions together helped to triangulate and guide the rubric to ensure content validity. Each AMS certified participant has worked in a Montessori environment for a minimum of three years, ensuring that they are well trained in the daily practice of Montessori theory. While they did not use the rubric to
examine any classroom environment, they were asked to consider the rubric as a checklist for fidelity and consider each item as an indicator of a well-prepared Montessori classroom environment. Additionally, three participants were asked open-ended questions about Montessori practice, environments, and evaluation or assessment of Montessori classrooms and students. These informal follow-up interviews were not recorded, but notes were taken and incorporated into the rubric revision.

After all comments and input were considered and included, a revised version was sent back to each participant for review. This final version of the rubric should serve as a reasonable method of examining a modern Montessori classroom for alignment with the AMS interpretation of Dr. Montessori’s philosophy.

**Analysis**

Participants’ feedback was reviewed three times. First, I reviewed each participant’s feedback as it was received. This separated each response from the others and allowed me to consider each independently to generate themes or general categories of comments. When all participants’ responses were received and tagged with potential themes, I aggregated and refined the tags into three themes: (1) physical space, (2) ambiance or intangible environmental factors, and (3) curricular areas. The data was then revisited for specific evidence of each of these three themes. Finally, I reviewed the initial list of theme ideas to investigate any that did not easily fit into the three general themes.
The participants’ feedback validated the rubric because each participant is currently an active member of the AMS Montessori community. While the initial rubric was designed based on Dr. Montessori’s written work, AMS Montessori teacher training, and my own experiences as a Montessori teacher, the revised rubric is grounded in current practitioners’ perspectives. In this way, the theory is tied to the practice, and the practice is tied to the assessment tool – the rubric.

Each participant’s response included specific evidence that he or she believed the rubric captured the basic identifying elements of an ideal Montessori primary classroom physical space. For example, one participant responded, “a high score would reflect a well prepared Montessori classroom.” Four of the five responses mentioned a need for evaluation of ambiance or other intangible environmental factors. These factors included use of quiet voices amongst teachers and students, beauty, and joy. Three participants suggested the addition of a section for evaluating a peace area or table. In many modern Montessori classrooms, a specific area is provided for students to resolve conflicts amongst themselves. An example of this might be a table with an object to pass back and forth indicating whether the holder is listening or speaking. This was incorporated into the rubric’s Instructional Fidelity section, under the subheading of Student Demeanor.

Results

Beginning with the Structural Fidelity section of the rubric, participants commented that the descriptions of the physical environment fit their concepts of
an ideal Montessori environment. One respondent commented, “the classroom space should be designed for the children.” The furniture should be child sized and all necessary materials easily accessible to the students, as Dr. Montessori required in her original Children’s Houses. The school environment category encompasses the building outside the classroom itself. This should include space for students to store outdoor gear, and accessible restroom facilities. This section also includes a criterion that the daily activities of the Montessori classroom should be interrupted as little as possible. Two respondents commented that this is difficult in modern Montessori classrooms because of the market desire for “specials classes.” These classes may include foreign language or arts related content taught by content specific teachers. Such activities are not discussed in Dr. Montessori’s work, and respondents did not believe them to be valuable for Montessori practice. Instead, they made the distinction that these were necessary because of parents’ (the market) demands of the school, regardless of the Montessori philosophy.

The Instructional Fidelity section covers training and affiliations, adult and student demeanor. Respondents agreed that a minimum of one certified teacher was reasonable. However, the criterion requiring the school to recognize a single perspective of Montessori theory, whether by policy, or accreditation by a national group generated some reservations. One respondent co-teaches with someone who is certified by the Association Montessori Internationale, and thus their classroom would not receive full marks for this criterion. She described thoughtful conversations between herself and her co-teacher regarding practical differences,
which she felt led to a better understanding for both of them. This purposeful modification of both their perspectives seems to fit well with the original intent of the AMS to provide a location specific version of Montessori practice.

The subsection regarding adult demeanor was of particular interest to all five respondents. The two who did not provide follow up interviews commented on this section in their written feedback. All were looking for more descriptions of the adults’ general feeling, or “vibe.” Ideal teachers were described as “nice,” “friendly,” “happy,” and “kind.” However, when asked for observable representations of these characteristics, it was difficult for respondents to provide many beyond “smiles” and “speaks in a quiet tone of voice.”

The final section of the rubric, Montessori Lesson Fidelity, is composed of four subsections corresponding to the four basic curricular areas in the Montessori method: (1) practical life, (2) sensorial, (3) language arts, and (4) mathematics. Each subsection contains some of the basic lessons described in Dr. Montessori’s work and which are explicitly taught in AMS teacher training courses. The aims of each material are the most important points, while the materials themselves may show some variation. One respondent commented that many of the lessons of practical life could be taught using household materials in the same way Dr. Montessori originally sourced materials for her first Children’s House. Another respondent suggested an additional area for “bonus points” for lessons outside these four curricular areas, but which were “obviously Montessori.” However, it was difficult to come to an agreement about how to distinguish materials as
Montessori or not if they were not either taken from Dr. Montessori’s work or taught in some variation in the teacher training courses.

All five respondents agreed that the initial rubric presented a good representation of identifying elements for an ideal AMS primary Montessori classroom environment. All agreed that a high score on this rubric would be indicative of a well-prepared classroom. Three respondents made suggestions for wording changes, but all the proposed edits concerned non-physical environment characteristics. Additionally, each respondent expressed reservations about the intangible characteristics required for the overall ‘feeling’ of a Montessori environment. For example, one respondent explained that she once observed a classroom in a school that was “AMS accredited, but I did not feel it was a high fidelity classroom.” Others commented on the aesthetics of the classroom environment as well as the adults’ attitudes as subjective qualities that could “make or break” the overall community feeling.

This rubric was intended as a first step towards creating a document to assist in determining whether practice aligns with the AMS perspective for Montessori classrooms - a lengthy, iterative process. Thus, the initial focus was on primarily physical classroom environment characteristics that could be easily defined and observed. In their description of creating a program assessment rubric, Rochford and Borchert (2011) call for “sufficiently specific and observable” (p. 260) characteristics as a first step to building items for a rubric. To appropriately include considerations for the ambiance or intangible environmental factors, additional
research would be required to determine observable demonstrations of these factors. By focusing on the physical aspects of the classroom, with few references to the intangibles such as ambiance and adult demeanor, this rubric seems to have established a good foundation for agreement amongst AMS practitioners.

**Limitations**

There is little empirical and quantitative research about Montessori (Daoust, 2004; Lillard, 2005a; Lloyd, 2008; Miezitis, 1971; Walsh & Petty, 2007; Whitescarver & Cossentino, 2008). The design of this study is based on my own and others’ knowledge and experiences with Montessori practice as AMS certified Montessori teachers. Because of the differing perspectives of Montessori (American Montessori Society, 2013b; Association Montessori Internationale, 2012; Montessori Accreditation Council for Teacher Education, 1995; North American Montessori Teachers’ Association, 2014), the results of this project are limited. More research is required to generate rich descriptions of observable events in Montessori settings, and especially to determine means of evaluating the intangible aspects of Montessori environments. Furthermore, research comparing the implementation differences between groups would help to better understand Montessori practice more generally in the 21st century. While the rubric generated from this project applies specifically to AMS primary classrooms, the hope is that its creation might help to uncover some characteristics that could be generalized to other viewpoints and other age groupings, inside and outside of the AMS.
Recommendations for Practice

This rubric presents a means of considering how well classroom practice aligns with the AMS perspective of the Montessori philosophy. Going forward, Montessori practitioners could use this rubric as an observation guide for self-study of their own or other AMS primary classrooms. Teachers might be interested in using it as a set of guidelines for preparing their classrooms at the start of the year and for evaluating their changing spaces over the course of the school year. Administrators might find the rubric useful as a starting place for monitoring the fidelity of their teachers’ classrooms and for comparing the similarities and differences between the classrooms within their schools to maintain pedagogical consistency. Parents and prospective parents may also find this rubric useful as a guide for observing their children’s classrooms and identifying aspects which might be more or less important to their own parenting styles and interpretations of Montessori philosophy.

Each of these suggestions assumes low stakes use of the rubric. It should only be used as a guide towards understanding observations. It has not been tested for reliability or validity; it has only been assessed by current practitioners who might serve as content area experts. Future research might include a pilot test of the rubric to generate data regarding reliability and validity.
Conclusions

The rubric generated from this project provides a foundation for identifying classroom characteristics that demonstrate alignment with the AMS perspective of the Montessori philosophy for primary classroom environments. Each participant, with their varied perspectives, agreed that the items contained in the rubric are representative of the basic elements of an ideal AMS primary classroom. The five participants involved in this project provided a variety of experience within the AMS Montessori community. Each participant indicated that observing the physical environment provides a good starting point for evaluating the fidelity of a Montessori primary classroom. Once the physical space is observed, the intangible environmental factors can be considered. The next step towards creating a comprehensive rubric should involve an investigation into appropriate observable manifestations of the intangible, ambiance-related characteristics of Montessori environments. These might include teacher and student behavior, noise level in the classroom, and indicators of student autonomy and independence.
Appendix A: Form email to potential participants

Dear ____,
You are receiving this email because you expressed interest in providing feedback on a rubric for evaluating Montessori. If you no longer wish to participate, please respond to this email with the subject “no longer interested.” Your participation in this research project is completely voluntary and you will not be compensated in any way.

Purpose
For my master’s thesis, I am attempting to create a rubric for the evaluation of primary Montessori classrooms.

Background
The rubric items will be based on the translated works of Dr. Maria Montessori as well as my American Montessori Society accredited training and experience.

Your Role
If you are interested in helping me with this project, please respond to this email. I will then send you my initial rubric for your review. To provide feedback, you can email me back or we can set up an appointment to talk in person or via phone or Skype. I am simply interested in your thoughts and opinions based on your experience with Montessori. Unless you request otherwise, my final paper will include only a general description of your relationship to Montessori, including; (1) your current position, (2) the number of years you have been working in a Montessori-related capacity, (3) your perspectives of Montessori (teacher, administrator, student, parent).

Process
After collecting input from each of you, I will make revisions to my initial rubric and send you a copy. This will be the last opportunity for you to make comments. I will also send you a copy of the final rubric.
I hope that you are still interested in helping me with my thesis project. Please contact me if you have any questions.

Thank you,
Gwen Mak
George Mason University
College of Education and Human Development
Appendix B: IRB Determination of Exempt Status

Office of Research Integrity and Assurance
Research Hall, 4400 University Drive, MS 605, Fairfax, Virginia 22030
Phone: 703-993-5440; Fax: 703-993-9990

DATE: July 1, 2014
TO: Anthony Kelly
FROM: George Mason University IRB
Project Title: [622266-1] Measuring Montessori
SUBMISSION TYPE: New Project
ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: July 1, 2014
REVIEW CATEGORY: Exemption category #2

Thank you for your submission of New Project materials for this project. The Office of Research Integrity & Assurance (ORIA) has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

Please remember that all research must be conducted as described in the submitted materials.

Please note that any revision to previously approved materials must be submitted to the ORIA prior to initiation. Please use the appropriate revision forms for this procedure.

If you have any questions, please contact Bess Dieffenbach at 703-993-4121 or edieffen@gmu.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within George Mason University IRB’s records.
Appendix C: Initial Rubric

Scoring
Scores should be given for each point under each heading. Scoring should be completed based on an observation period of at least 30 minutes, and no more than three hours. Scores from multiple observations may be averaged. Numerical scores should be given for each item based on the following scale:
3 – Highly evident: easily observable within minutes of entering the classroom, or in the case of specific materials, within minutes of consciously seeking the item
2 – Partially evident: observed, one exception
1 – Difficult to observe: inconsistently observed or with more than one exception
0 – Non-existent: not observed for the duration of the observation period

Structural Fidelity

<table>
<thead>
<tr>
<th>Score</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Classroom Environment</strong></td>
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</tr>
<tr>
<td>• Furniture and materials are child sized and age appropriate - weight of tables and chairs permits movement by students</td>
<td></td>
</tr>
<tr>
<td>• Space is clean and tidy - materials are laid out in obvious places on shelves with empty space between lessons</td>
<td></td>
</tr>
<tr>
<td>• Desks/table top workspaces are dispersed throughout the space, not in rows</td>
<td></td>
</tr>
<tr>
<td>• Ample space for every student to have an individual workspace at any given time</td>
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</tr>
<tr>
<td>• Art/decor is minimal and oriented towards students - hung low on walls, representing realistic images or items</td>
<td></td>
</tr>
<tr>
<td>• Only one of each lesson material is available on the shelves (with some exceptions)</td>
<td></td>
</tr>
<tr>
<td>• Minimum of 4 core curricular areas in the area accessible to all students: Practical Life, Sensorial, Mathematics, and Language Arts*</td>
<td></td>
</tr>
<tr>
<td><strong>School Environment</strong></td>
<td></td>
</tr>
<tr>
<td>• Students can independently access the restroom facility</td>
<td></td>
</tr>
</tbody>
</table>

*Note: This section includes an asterisk, indicating a special condition or clarification related to the core curricular areas.
- Students have independent access to their own outerwear - coats, shoes, etc.
- Outside interventions are kept to a minimum - daily 3 hour work period

**Outdoor Environment**
- Permits/encourages exploration and interaction with nature
- Children have access at least once daily

**Instructional Fidelity**

<table>
<thead>
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<th>Score</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
<tr>
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<td>- At least one adult certified for the age group of the classroom</td>
</tr>
<tr>
<td></td>
<td>- School policy identifies with one or more national accreditation groups - does not require complete accreditation, but recognizes a particular viewpoint</td>
</tr>
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<td>- Environment serves a 3-year age range of students (typically 2.5-5/6)</td>
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<tr>
<td></td>
<td><strong>Adult Demeanor</strong></td>
</tr>
<tr>
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<td>- Appearance is neat</td>
</tr>
<tr>
<td></td>
<td>- Behaviour presents a model of calm and collected well-being</td>
</tr>
<tr>
<td></td>
<td>- Speech is calm, well-enunciated, and precise</td>
</tr>
<tr>
<td></td>
<td>- Disciplined in inhibiting own inclinations to do for the students what they can accomplish themselves</td>
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<td>- Directives are presented in the positive - i.e. please walk vs. don’t run</td>
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<td>- Actions evidence of careful forethought and preparation</td>
</tr>
<tr>
<td></td>
<td><strong>Student Demeanor</strong></td>
</tr>
<tr>
<td></td>
<td>- At any moment, majority of students are engaged/focused in a purposeful activity</td>
</tr>
<tr>
<td></td>
<td>- Interactions between students is permitted except in cases of disruption to others’</td>
</tr>
</tbody>
</table>

**Montessori Lesson Fidelity**

*Practical Life.* All materials in this area are designed to promote order, coordination, concentration, and independence. In addition to the four common indirect aims, each lesson should have an obvious direct aim, which teaches the student a skill related to their culturally specific environment. For each lesson, the examples provided are not meant to be prescriptive; instead they are intended to illustrate
what best practice might look like. Reasonable alternatives are acceptable so long as they conform to the original direct and indirect aims. A rule of thumb for determining whether a lesson is a reasonable alternative is to consider whether the lesson involves the best practice of the skill being taught. For example, a rug unrolling lesson involving shaking the rug in mid-air might result in the disturbance of others' work. Instead, carefully laying the rug on the ground and unrolling it slowly away from you would be a best practice.

<table>
<thead>
<tr>
<th>Score</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Basic Lessons - no standard shelf materials, but may be observed as individual or group lessons given by the teacher</td>
</tr>
<tr>
<td></td>
<td>• Grace and courtesy - manners (please, thank you, etc.), respectful communication, and conflict resolution</td>
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<tr>
<td></td>
<td>• General Control &amp; Coordination - walking along the line (ellipse or similar round shape, drawn in tape on the floor), carrying furniture safely, rolling and unrolling rugs for work (or similar best practices for portable work spaces)</td>
</tr>
<tr>
<td></td>
<td>Transfer Tasks - includes tonging, pouring, sorting</td>
</tr>
<tr>
<td></td>
<td>• Minimum of 3 separate materials arranged in order from least to most difficult (i.e. pebbles, sand, colored water)</td>
</tr>
<tr>
<td></td>
<td>• Each material on a defined tray</td>
</tr>
<tr>
<td></td>
<td>Personal Care</td>
</tr>
<tr>
<td></td>
<td>• Minimum of 4 separate materials, each focused on a single self-care task i.e. buttoning, zipping, hand washing, bow tying, basic sewing</td>
</tr>
<tr>
<td></td>
<td>Care of the Environment</td>
</tr>
<tr>
<td></td>
<td>• Minimum of 3 accessible and child sized general cleaning tools, enough to enable children to clean up their own spills or messes - i.e. broom, mop &amp; bucket, dust pan</td>
</tr>
<tr>
<td></td>
<td>• Washing lessons - at least washing a chair and washing a table - each lesson has a dedicated spot on a shelf, with all necessary materials stored together - other washing examples include washing leaves of a plant, washing cloths, polishing activities</td>
</tr>
</tbody>
</table>
**Sensorial.** Materials in this curricular area are designed to teach discrimination. Initial lessons should be given with simple naming of extremes (thinnest/thickest, shortest/tallest) to focus attention on the sense being strengthened. Materials should all be self-correcting such that the student can identify his/her own errors.

<table>
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<tr>
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</tr>
<tr>
<td></td>
<td>• Lessons involve grading identical items except one characteristic - size, color, form</td>
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<tr>
<td></td>
<td>• Minimum of 3 lessons involving differently shaped objects for understanding variety of discrimination: shortest to tallest, thinnest to thickest, darkest to lightest</td>
</tr>
<tr>
<td></td>
<td>• Examples of traditional Montessori materials: Pink Tower, Long/Red Rods, Broad/Brown Stair, Knobless Cylinders, Knobbed Cylinders, Color Tablets, Geometric Solids</td>
</tr>
<tr>
<td></td>
<td><strong>Auditory Discrimination</strong></td>
</tr>
<tr>
<td></td>
<td>• Minimum of one material involving at least 4 pairs of objects that make distinct sounds for student match</td>
</tr>
<tr>
<td></td>
<td>• Bonus: Montessori bells</td>
</tr>
<tr>
<td></td>
<td><strong>Tactile Discrimination</strong></td>
</tr>
<tr>
<td></td>
<td>• One material to teach opposing textures - rough/smooth</td>
</tr>
<tr>
<td></td>
<td>• One material for pairing 4 different textures of fabrics</td>
</tr>
<tr>
<td></td>
<td>• Mystery Bag - Opaque bag containing objects for student to identify by touch only</td>
</tr>
</tbody>
</table>

**Language Arts.** Lessons in this area begin with strengthening the student's ability to speak language and progress into writing and reading. Preliminary lessons also focus on strengthening the muscles for writing, understanding of the use of language, and understanding relationships.

<table>
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<tr>
<th>Score</th>
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<td><strong>Vocabulary Enrichment</strong></td>
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<td>• Small to large group interactions that encourage appropriate social habits (taking turns to speak, telling stories, reciting poems) - one or two lessons of this sort per day, not to exceed 15 minutes</td>
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<td></td>
<td>• At least 2 separate materials to teach the meaning of symbols - beginning with matching pairs of objects, then matching physical object to an image of the object</td>
</tr>
</tbody>
</table>
### Preparation for Writing and Reading

- **Sandpaper Letters** - one set of the alphabet, each letter in script or print on a separate stiff board (pink for consonants, blue for vowels), large enough for child to trace the line with 2 fingers - lesson should be given individually using 2 or 3 letters at a time, pronouncing the phonetic sound of each letter while tracing the line with 2 fingers
- **Moveable Alphabet** - at least one set (no more than 3) of cut out letters of the alphabet color coded to match the sandpaper letters
- **Set of objects representing simple, phonetically spelled words** to be built using the Moveable Alphabet
- **Set of pictures representing simple phonetically spelled words** to be build using the Moveable Alphabet

### Writing Practice

- **Metal Insets** - geometric shapes for tracing to practice proper pencil grip - could be substituted with something similar which achieves the same indirect goals as the metal insets lesson
- **Non-permanent writing surfaces** - at least 2 chalkboards or white boards with chalk or markers for students to practice writing
- **Lined and unlined paper** for writing with pencils

### Reading

- **2-part cards** - used to match images with their labels
- **Word grouping by phoneme** - lists of words or sets of small objects grouped together by phoneme for practice writing and recognizing phonemes

---

**Mathematics.** Lessons in this area are given in order from concrete to abstract. Materials should be used in a way to promote understanding of place value.

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<td><strong>Quantities &amp; Symbols</strong></td>
</tr>
<tr>
<td></td>
<td>- <strong>Number Rods</strong> - progression from red rods in Sensorial section - set of 10 rods beginning with 10cm long rod, increasing in length by 10cm, each 10cm section colored alternately red and blue</td>
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|       | - **Association of quantity with symbols** - at least 2 materials - examples of traditional materials are Spindle Boxes - two boxes, each with 5 equal spaces, each space clearly labelled with numbers from 0-9 the top, child places corresponding number of spindles in each space; Cards and Counters - numbers 0-9 printed on individual cards, with 45 identical small objects to line up below each number (in the second lesson, child needs to know the order and orientation of the numbers to complete the
Decimal System

- **Golden beads** - sets of beads, individual, rods of 10, squares made up of 10 rods, and cubes made up of 10 squares
- **Bead chains** - set of beads chained together 1-10 for teaching skip counting, squares and cubes, each number set a different color
- **Bead stairs** - individual bars of beads, color coded to match the bead chains for teaching arithmetic operations consistently

### Appendix D: Final Rubric

**Scoring**

Scores should be given for each point under each heading. Scoring should be completed based on an observation period of at least 30 minutes, and no more than three hours. Scores from multiple observations may be averaged. Numerical scores should be given for each item based on the following scale:

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given time
- Art/decor is minimal and oriented towards students - hung low on walls, representing realistic images or items
- Only one of each lesson material is available on the shelves (with some exceptions)
- Minimum of 4 core curricular areas in the area accessible to all students: Practical Life, Sensorial, Mathematics, and Language Arts*

**School Environment**
- Students can independently access the restroom facility
- Students have independent access to their own outerwear - coats, shoes, etc.
- Outside interventions are kept to a minimum - daily 3 hour work period

**Outdoor Environment**
- Permits/encourages exploration and interaction with nature
- Children have access at least once daily

**Instructional Fidelity**

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<tr>
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**Student Demeanor**
- At any moment, majority of students are engaged/focused in a purposeful activity
- Interactions between students is permitted except in cases of disruption to others’

**Peace Area**
- There is a dedicated space, accessible to students, for resolution of conflicts
- If a conflict between students is observed, students use this space to resolve conflicts amongst themselves

**Montessori Lesson Fidelity**

*Practical Life.* All materials in this area are designed to promote order, coordination, concentration, and independence. In addition to the four common indirect aims, each lesson should have an obvious direct aim which teaches the student a skill related to their culturally specific environment. For each lesson, the examples provided are not meant to be prescriptive, instead they are intended to illustrate what best practice might look like. Reasonable alternatives are acceptable so long as they conform to the original direct and indirect aims. A rule of thumb for determining whether a lesson is a reasonable alternative is to consider whether the lesson involves the best practice of the skill being taught. For example, a rug unrolling lesson involving shaking the rug in mid-air might result in the disturbance of others’ work. Instead, carefully laying the rug on the ground and unrolling it slowly away from you would be a best practice.

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<td>-------</td>
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| **Visual Discrimination** | - Lessons involve grading identical items except one characteristic - size, color, form  
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| **Auditory Discrimination** | - Minimum of one material involving at least 4 pairs of objects that make distinct sounds for student match  
- Bonus: Montessori bells |
| **Tactile Discrimination** | - One material to teach opposing textures - rough/smooth  
- One material for pairing 4 different textures of fabrics  
- Mystery Bag - Opaque bag containing objects for student to identify by touch only |

_Sensorial._ Materials in this curricular area are designed to teach discrimination. Initial lessons should be given with simple naming of extremes (thinnest/thickest, shortest/tallest) to focus attention on the sense being strengthened. Materials should all be self-correcting such that the student can identify his/her own errors.

*Language Arts.* Lessons in this area begin with strengthening the student's ability to speak language and progress into writing and reading. Preliminary lessons also focus on strengthening the muscles for writing, understanding of the use of language,
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<td>• At least 2 separate materials to teach the meaning of symbols - beginning with matching pairs of objects, then matching physical object to an image of the object</td>
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</table>

*Mathematics.* Lessons in this area are given in order from concrete to abstract. Materials should be used in a way to promote understanding of place value.
### Quantities & Symbols
- **Number Rods** - progression from red rods in Sensorial section - set of 10 rods beginning with 10cm long rod, increasing in length by 10cm, each 10cm section colored alternately red and blue
- **Association of quantity with symbols** - at least 2 materials - examples of traditional materials are Spindle Boxes - two boxes, each with 5 equal spaces, each space clearly labelled with numbers from 0-9 the top, child places corresponding number of spindles in each space; Cards and Counters - numbers 0-9 printed on individual cards, with 45 identical small objects to line up below each number (in the second lesson, child needs to know the order and orientation of the numbers to complete the work)

### Decimal System
- **Golden beads** - sets of beads, individual, rods of 10, squares made up of 10 rods, and cubes made up of 10 squares
- **Bead chains** - set of beads chained together 1-10 for teaching skip counting, squares and cubes, each number set a different color
- **Bead stairs** - individual bars of beads, color coded to match the bead chains for teaching arithmetic operations consistently
References


doi: [http://dx.doi.org/10.1016/j.lindif.2007.11.009](http://dx.doi.org/10.1016/j.lindif.2007.11.009)


doi: [http://dx.doi.org/10.1016/j.tate.2008.11.007](http://dx.doi.org/10.1016/j.tate.2008.11.007)


doi: 10.1007/s10643-010-0398-9


doi: 10.1080/02568540809594655


Biography

Gwendolyn J. Mak earned an International Baccalaureate diploma from the Washington International School, Washington, D.C., in 2002. She received her Bachelor of Arts from the University of Virginia in 2006. She was employed as a Montessori teacher and administrator in independent schools in Fairfax County for six years.