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Effects of Collaboration on Elementary Teachers

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Abstract

This action research study investigated the effects of bi-weekly, guided, intentional and collaborative classroom material development on the teaching practice of elementary teachers. The study was conducted at a private Montessori school of 125 students, and two elementary teachers participated. Data was collected using a variety of research tools including participant self-assessments, a prepared environment rubric, post-collaboration meeting reflection pages, daily reflection pages and a final conference with the teachers at the end of the research period. Both teachers expressed positive feelings towards the collaborative approach of enhancing their classrooms. The teachers also appreciated the ability to share ideas and best practices with a fellow professional colleague in a targeted area. As the study progressed, the teachers were less likely to share specific information on the daily reflection pages, and student engagement that was anticipated as a result of the subject area enhancements were not as significant as hoped for. The format of these collaborative meetings in a specific subject area could be used in the future as a successful team building mechanism for the entire school staff. Also, these targeted times could encourage material making and beautification of environments throughout the school year.

Keywords: collaboration, prepared environment
In addition to the hours spent with children during the school day and striving for their academic progress, elementary teachers have many demands on their time. Hours at a stretch each day can be spent preparing lesson materials, communicating with parents, or reviewing student work. In the case of a Montessori Elementary guide\(^1\), there is also the added responsibility of maintaining the prepared environment of the classroom. Traditional elementary classrooms oftentimes consist of desks or tables and chairs for students with the students maintaining their own school supplies. The Montessori teacher, however, ensures that all the Montessori materials and supplies of their community, both indoors and outdoors, are in proper order for the children at all times.

Oftentimes, the teacher has an adult assistant in the classroom during the school day to assist with some of these duties. Furthermore, the children of the class also have community responsibilities to help maintain the environment such as dusting and sharpening pencils. The teacher, however, must create handmade materials, update them and consistently review her training albums to fully implement the goal of a complete interdisciplinary approach to the education of the elementary child, or in short “Cosmic Education.” This is a Montessori specific term that is used as a summary of the pedagogical approach to the elementary child: teach them everything about the universe in an effort to capture their imagination and their enthusiasm for the pursuit of further knowledge.

Over time, the development of efficient classroom systems and reflection on teaching practices that have been successful make some aspects of the profession less

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\(^1\) “Guide” is name of the lead Montessori teacher in a classroom. While the term “teacher” will be used throughout this paper, any quotes from Dr. Maria Montessori or other Montessori trained contributors may use the term “guide.”
burdensome. One thing that does not change, however, is the significant amount of time that is required to enhance the prepared environment, such as the creation of new materials and updating of subject area shelves. Many elements need to be hand-made by the trained teacher or her adult classroom assistant or remade due to daily wear and tear by children. Oftentimes, this work can be overwhelming to a teacher to tackle independently during the school year. When these tasks are not completed on a routine basis, the classroom environment can become disorganized, unkempt and ultimately unappealing for the children to explore.

I wondered if setting up times with teachers that focused on meaningful and targeted collaboration for the enhancement of their classroom environments could make this task less burdensome. If they had a partner to work with and to share ideas and best practices, would their teaching practices improve and would it ultimately lead to higher engagement from their students in these subject areas? At some schools, the teachers have different training backgrounds for their Montessori teaching credentials through various organizations such as Association Montessori Internationale (AMI), American Montessori Society (AMS) or North American Montessori Teachers Association (NAMTA). Without a unified approach in their classroom preparation to follow this could lead to inconsistencies across classrooms, but in turn, it could also lead to tremendous sharing of best ideas that each teacher contributes.

This research study took place at a private Montessori school over the course of six weeks in which I facilitated weekly meetings for two Montessori elementary teachers to share ideas, best practices and a review of the Montessori training center principles in setting up the prepared environment. The meetings were conducted between myself and
one teacher at a time, independent of one another. If changes were to be made to enhance their environments, those changes were carried out collaboratively during these meeting times. The titles of their Montessori training albums (Art, Biology, Geometry, Geography, History, Language, Mathematics, Music) were the pool of available choices. At the outset of the intervention, the teachers selected three areas of their classrooms they would focus on. Two teachers took part in this study. The first, “Bob,” was the teacher for an upper elementary classroom (ages 9-12) containing 19 students, and the second, “Mary,” was the teacher for a lower elementary community (ages 6-9) with 25 students (pseudonyms were used to protect participant anonymity). Bob had received NAMTA elementary training (ages 6-12) through a Canadian online course and mentorship with an established and practicing teacher over nine months. Bob has taught for 11 years at the school in this age group. Mary completed an AMI training course in the United States for elementary teachers (ages 6-12) over the course of an academic year and has taught for five years at this age level. The research data collection period spanned six weeks. A review of the literature was completed for research on successful collaboration techniques amongst teachers and the nature of maintaining the fidelity of Montessori principles in a prepared environment.

**Review of Literature**

**Definition of prepared environment**

The prepared environment of a Montessori classroom includes the indoor and outdoor space for children, which are meticulously crafted by the teacher to meet the child’s needs for exploration and development. As outlined in Dr. Montessori’s *The Child, Society and the World*, the teacher
must put everything in order in the environment. She must see that the material is in perfect order. She must see that everything is attractive so that the children will like the environment as soon as they enter it (p. 14).

The physical environment has to allow freedom for the child and meet his developmental needs. Over time, specifically during the ages of 0-3 years and 3-6 years (considered the first plane of development) and then again in the 6-9 and 9-12 years of age (the second plane of development), the prepared environment changes to meet the needs of the child. The furniture, materials and tasks being required of them will advance as their intellect and independence increases. Awes (2015) stated that the elementary child between the ages of 6-12 years old has the characteristic of wanting to work with others, and not just do tasks in the classroom independently. Thus, the classroom for this age needs to provide collaborative features such as group tables so that the children can accomplish their goals. Also, the environment should support the child’s ability to problem-solve and think independently of adults as a way to practice academic and life skills. Mario Montessori, Dr. Maria Montessori’s son and lifelong collaborator once remarked:

The prepared environment should serve as that bridge, bringing the world at large and thus also the adult world, within reach of the child, at whatever stage of development, partial or total, he may find himself at a given moment (2015, para. 2).

The preparer of this space, the teacher, takes into consideration the physical space of the classroom itself, the furniture positioned inside of it, and finally the shelves in the room that contain the various manipulative materials for each of the subject areas including art, biology, geography, geometry, history, language, mathematics, and music. The teacher
provides materials for the children to create their own free-choice work such as a variety of papers, writing implements, paints, instruments, and containers to conduct experiments, to name just a few. The availability of these materials may inspire meaningful follow-up work by the child. This is very different from the traditional education environment of a public school elementary classroom, for instance. According to Malm (2004), the most significant differences between Montessori and conventional education are the concepts of individuality and freedom, the prepared environment and the role of the teacher. While the furniture is scaled to be appropriate for the children’s size and age, there typically is not a variety of materials freely available to the children to explore in these traditional settings. Though there may exist nuanced differences in the interpretation of a teacher’s training, the teacher herself is an integral part of a Montessori environment, as her energy and passion contributes to the spirit of the classroom. Thus, the case could be made that the prepared environment includes the mental and spiritual preparation of the teacher herself.

**Environment should feel home-like**

Since the child will typically enter into elementary school as the first place where they are functioning the majority of their day independently of their family, this can prove to be a very daunting transition for him psychologically. O’Donnell (2012) remarked that an effort had been made in recent classroom designs to ease this transition by making the school spaces more inviting and more resembling that of a residential environment. There is a desire to reduce the perception of school as institutional and unwelcoming and make it more home-like. Nuhfer (2004) concluded that the best learning environments take their cues from homes, which display the kinds of space that
people themselves choose to live in and maintain. When this theme is followed, the classroom can exude a feeling of warmth, security, and the supportive spirit that is found in a home. Lackney (2007) echoed the sentiment that when the physical and social home-like characteristics are incorporated into the institutional setting, it reduces anxiety in both the parent and the child. Ultimately this leads to the children feeling more comfortable and enables them to better concentrate on learning.

A key feature of the Montessori classroom is that there are a variety of hands-on materials to work within all of the subject areas. Dr. Montessori knew that children found it difficult to concentrate on spoken words, such as lecture based instruction, from the adults teaching them, but when the children have something to work with in their hands, they were more attentive and retained the skill that was being taught. Dr. Montessori (1949) explained that:

The problem of teaching children cannot be solved by having good textbooks or by getting a good teacher into the classroom to say the right things about objects that the child cannot see, but rather by building a life-environment that contains objects that will concretely represent the things to be learned (p. 80).

Huxel (2013) stated that there are four essential elements to an authentic Montessori experience that should exist when constructing a prepared environment for children. One of these elements is the allowance of children to make choices in their work and the materials they use to do their work. The second and third elements are that the environment encourages and supports independence and allows for the child’s freedom of movement. An example which showcases both of these elements, would be to not assign seats, but to allow the child to choose their workspace based on the need of
their project and with whom they will be working. By having a variety of group tables, rugs and low tables available to the child, they can choose where to work and for how long. The final essential element, according to Huxel, is the development of intrinsic motivation in the child, which is the result of not administering tests or instituting reward systems. The teacher should encourage the child to seek projects and to complete them due to the feeling of accomplishment and pride they will achieve rather than an external award (p. 32). Huxel also reemphasized, echoing Malm (2004), the concept that the teacher is part of the prepared environment. The preparedness of the teacher beyond her training is pivotal. Huxel goes further to say that truly the spiritual and reflective nature of the teacher will either make or break how the method will unfold for the children she leads. If the teacher never refines her teaching methods or considers what is working for the children and what is not working, which can vary from year to year based on the unique members of that community, she limits her ability to meet their needs. Despite rigorous pedagogical training, regular reflection on whether or not she is staying true to those ideals needs to be carried out on a regular basis. Otherwise, complacency and stale teaching practices may result.

**Guide as creator of environment**

Grazzini (2004) explained how managing Montessori materials alone is only one facet for which the teacher is responsible. The ideal Montessori teacher is one who “is grounded in knowledge, vision and attitude all at the same time” (p. 23). Since the teacher is the one who creates the environment, she must always maintain that she is setting up tangible and realistic learning opportunities in which the child acts on his environment. Education is not acquired by listening to words, but by the child having
experiences with materials and work in the classroom. Dr. Montessori (2011) supported this with, “The teacher’s task is not to talk, but to prepare and arrange a series of motives for cultural activity in a special environment made for the child” (p. 8). McNamara (2016), an upper elementary Montessori teacher who leads children ages 9-12 years old, admitted to desiring his students to be like Galileo so that they explore and infer. The carefully crafted environment “presents students with opportunities to ask questions, make predictions about possible outcomes and explore problems relevant to them as opposed to problems or experiments in textbooks that I provide” (pp.92-93).

An interesting phenomenon is that even within the two most common training camps of Montessori teacher: American Montessori Society (AMS) and Association Montessori Internationale (AMI) there is great variation amongst classroom components. Lillard (2016) found that while some classrooms use only Montessori materials, others supplement classrooms with games, puzzles and other commercially available items. The effects of all of these extraneous, non-essentials in the classroom were then measured to see if fidelity to the materials had an impact on the children. A conclusion that could be drawn from this study was that perhaps the teachers who chose only to have the traditional Montessori materials in their classrooms also adhered more tightly to the other aspects of the Montessori method. Thus, it was those aspects, not the materials, which explained the higher gains from students in those classrooms. Haskins (2012) deemed it the teacher’s responsibility for ensuring that there are no unnecessary objects in the environment and should exercise vigilance in her efforts to keep the room uncluttered and pleasing to the eye.
Cossentino (2009) equated the Montessori teacher training with that of the training of a chef or musician; the concept of teaching a “craft” to someone. For example, a chef learns how ingredients work together and what tastes complement each other, but eventually no longer has to follow a recipe word for word. Similarly, the way a Montessori teacher then improvises is that she is able to direct large, mixed-age classrooms in which children pursue individualized study using an array of didactic materials (p. 524). Rigorous training that allows for flexibility when needed is what makes it possible for an authentic Montessori teacher to view the classroom each day and every year as dynamic, fluid and ever-changing. Huxel (2013) remarked that just like the children, the teachers are in process and never finished, but continuously in a state of learning. In fact, it is their observation and flexibility that allow the teacher to identify materials to put on the shelves for their students.

**Most important features of the environment**

In addition to the preparedness of the teacher, there are some essential characteristics of the materials that are set forth for the child in the classroom. Loeffler (1967) claimed that “a school for young children would need to entice the child to learn through carefully presented stimuli which beckon the child to explore, question and assimilate knowledge and understanding through his own experimentation” (p. 12). Dr. Montessori (1949) stated that,

The child must rise to the higher order of the spirit through concrete things. When we put before him the greatest ideas and discoveries of the human mind, he will be stimulated and his enthusiasm will be aroused (p. 107).
Haskins (2012) described a well-done Montessori environment as that which resembles a carefully crafted piece of art, a skillfully constructed laboratory for the study of life. Now, this undertaking can be daunting for most educators and often seen as “a labor of love and a commitment of extraordinary depth” (p. 34).

Haskins took two key components of the prepared environment: organization and beauty, and stated that they are both prerequisites in the classroom, and are absolutely not optional. Organization is so important because a child has an innate sense for order. Keeping things properly arranged will allow him to find what he needs based on his interests. There are stories from Dr. Montessori of children becoming irritated when things would not be in the proper order or sequence. Haskins purported that a well-organized learning environment encourages autonomy as the child grows and becomes a functioning member of society. This overarching order that is to be maintained within the classroom is the responsibility of the teacher. Beauty, too, plays a role in the Montessori classroom and is a fundamental component because beauty is tied to auto-education for the children. The beauty of the materials evokes interest from the child and to learning with those materials. Even though not everyone sees beauty the same way or in the same things, Haskins claimed that people know beauty when they see it, because beauty causes them to pause in awe, to reflect, or to be still for a moment in appreciation. Everyone needs beauty because it is soothing to the soul and inspiring.

Teachers need to be involved in the decision-making process for how a classroom will be designed (Nuhfer, 2004). Successful projects that Nuhfer reviewed were those when respect and open two-way communication was used amongst administrative staff, teachers and designers coming up with the ideas and implementation of their work.
spaces. All who work in that space need to be able to express suggestions for the design but also “should feel a degree of responsibility for ownership of its décor and maintenance” (para. 1).

**Collaboration can lead to implementation**

The definition of collaboration is the ability to work within a group to plan and coordinate with one another to alleviate the workload. Collaborative teachers have been shown to be more willing to differentiate instruction due to the time saved by sharing responsibilities. This, in turn, would lead to better meeting the needs of their students. In multi-age classrooms studied by Bailey et al (2016), the main concern of teachers was that they must adapt curriculum materials to support the various skill levels in their classroom. They found that through teamwork, collaboration provides the ability to share the workload and reduce preparation time. Further, collaboration with others on a teaching team can also better serve the children. By leveraging their time in the creation of materials or lesson planning, the teacher then has a choice in how to spend their remaining time, and may include refinement of their teaching practices or self-care. Huxel (2013) proposed that the teacher should always be reflective of how her own actions help or hinder the team’s ability to serve the children in their community.

Malm’s study (2004) found that collegial sharing and collaboration between Montessori teachers from different schools and in different areas seem not to be common. Some of the teachers felt that there was competition between groups of Montessori teachers with various teacher-training backgrounds or the feeling that schools in the same area compete with one another with regard to student intake.
Lackney (2007) set forth the fact that teachers are professionals and require a space for identity as part of the educational environment. The old concept of a “teacher’s lounge” is out of date and out of sync with today’s concept of education. The teachers are no longer the center of education, the learners are. However, providing spaces for teachers to collaborate such as clustered office spaces that are shared or conferencing rooms where they can meet to exchange information and teaching experiences can yield great benefits and boost productivity due to shared facilities for the school faculty.

In addition to the physical space considerations that promote collaboration amongst educators, time to do so during the school year as part of an intentional effort by school administrators to promote coaching and collaborative lesson planning can be extremely beneficial (Bauml, 2016). While collaborative lesson planning is defined by Bauml as that which is jointly developed by more than one person, there are several different forms it can take. At its simplest, teachers may pair up or form groups to collaborate by content area. This can often be an approach that divides and conquers, so that teachers who are not working in a certain area, will never review the work that others did, just use the lesson plan that results. Bauml noticed that when teachers are in isolation when planning and then merely “distribute them to fellow teachers, they don’t realize the full potential of doing the work with the other teachers” (p. 60). Bauml recognized that more commitment from educators is needed to get at the highest form of collaborative lesson planning and that this type of work can be most helpful to new teachers. She also provided data on a scenario where a team of second grade teachers worked together to plan out lessons, with the senior teacher offering best practices advice due to her years of experience. Once all of the lessons had been planned for the subjects,
the team of eight teachers reviewed them and discussed them as a group. This led to reflections from this team, particularly from the new first year teacher, that the highlight of her first year of teaching was “Team planning. Doing it together. Because I would be lost without it” (p. 60). Professional learning that is useful and practical for educators and school improvement are also some of the benefits of collaborative planning. It has also been reported that job satisfaction can be heightened with collaborative efforts at schools (MetLife Survey of the American Teacher, 2010). This study contained a component that examined highly satisfied teachers against those who are not, and the collaborative efforts with other teachers at their school and their administration. The frequency of time spent to collaboratively support one another was much higher with the highly satisfied teachers (p. 47).

There also are some challenges that come with collaboration. Two of these include a lack of time and teacher resistance to working with one another. The resistance may arise from teachers feeling vulnerable to criticism from their co-workers and these teachers may be encouraged to change routines that they are not comfortable with. Baumk suggests three essentials that are consistently found across successful collaborative projects. The first is time, and that adequate time is set aside for teachers to work together. Administration plays a big role in making this possible to allow planning meetings or using professional development hours for this purpose. Training and support is further necessary so that all those involved understand how to communicate with one another and foster a supportive atmosphere of growth. There needs to be a clear purpose for why this collaboration is worthwhile, whether it is for student achievement or fostering a team atmosphere amongst the staff, or both. Finally, trust between
administration and teachers, is not to be underestimated. Accountability for collaboration and ongoing check-ins provide the structure needed to keep the dialogue going.

This structure was taken a step further by Perez-Katz (2007) who created a Teacher Collaboration Model (TCM) in which every teacher at the high school in which she was principal had a collaborative partner and weekly time together was provided by administration. This time was used to make curriculum planning decisions or create milestones for their classes. She found that “teachers who had an ally in the building learned a lot from informative conversations with one another. In addition, I learned that the best professional development happened when teachers had well-structured time to meet and reflect on their practices, such as in grade-based or departmental teams” (p. 39). She provided her staff with extensive training on collaboration techniques and communication styles so that their time together could be useful and ultimately lead to tremendous school improvement on a large scale. Required readings and even an off-site retreat for the teachers drove this concept home to all those involved. Taking the time to effectively train and providing opportunities for ongoing reflection and work with one another were vital. Perez-Katz ultimately found that when teachers work in pairs, they can “observe each other, learn from each other and take risks that they wouldn’t take on their own” (p. 41).

Conclusion

The literature shows that creating a warm, home-like atmosphere in an educational environment puts the children at ease and better able to learn. Creating this environment is a massive undertaking by the teacher, but one that demonstrates their fidelity to the Montessori principles when done correctly. Even though supplemental
materials not shown in training courses have been incorporated into some prepared environments, there is debate as to whether or not these additional items provide any benefit to the children. Ultimately, it is the teacher’s responsibility to keep the prepared environment organized and beautiful to aid the children’s discovery and instill in them a sense of awe and inspire them with beauty. Dr. Montessori in the *Absorbent Mind* simplifies it to this essence:

> [Teachers must] not impose themselves on the child, but be vigilant and prepare all for the child and then put it at his disposal and leave him (p. 255).

The way in which teachers collaborate and share best practices in their environments and instruction should be further researched to see if this supports fidelity to their Montessori training and ultimately to improved learning outcomes for their students.

**Methodology**

Prior to the intervention period, Bob and Mary completed a pre-survey (Appendix A) to provide information on how they currently enhance their prepared environments. The survey asked if Bob or Mary preferred to work independently or with others and if either of them needed visual inspiration before making changes. The survey asked Bob and Mary to select three areas of their classroom that they would like to focus on during the intervention period. These three areas came from the choice of eight album names from their Montessori training course as follows:

1. Art
2. Biology (includes botany, zoology, outdoor garden)
3. Geography (includes chemistry, Earth science, physics, maps)
4. Geometry
5. History

6. Language (grammar, writing, reading materials)

7. Mathematics

8. Music

Of these three areas, Bob and Mary prioritized their goals with a ranking for enhancing these areas of the classroom. Finally, a budget amount was requested from each participant, to find out how much money would be able to be spent should additional materials need to be purchased the participants or me to carry out enhancements.

Once the pre-survey was completed, Bob and Mary then completed a prepared environment rubric (Appendix B). Each participant completed only the sections that related to their focus areas. For example, if biology was chosen as a focus area, then they would complete the rubric section for both the biology shelves and the outside garden area. I also completed a rubric for the three target areas chosen by the participant and a first meeting to discuss results and priorities for the intervention period was scheduled. This first one-hour meeting consisted of reviewing the rubrics and discussing any differences in our assessments of the focus areas. This was important, because if the participant thought the area was excellent, while I thought the area was poor, there could be issues in mismatched expectations. If this occurred, clearly more would have to be discussed at that initial meeting to understand each other and better align expectations.

At this meeting, I provided photographs of the selected three areas as displayed in a model classroom (taken from an AMI training center) to act as inspiration and serve as the guideline for what materials should be included in each section of the room (Appendix C). I also provided the “Prepared Environment” lecture notes (Appendix D)
from my AMI training course to the participants to help prime them on many of the principles we would be working towards during our time together. Access to Montessori materials that needed to be added and any purchases that needed to be made (such as new baskets or vessels for holding materials) were then completed next and the first target area to be focused on was scheduled for the following day.

At this next session, I met with each participant independently. We removed all the existing materials off of the focus area shelf and completely cleaned shelves, rearranged items and made space for new additions of materials. This time also allowed the participant and I to discuss project ideas and share best practices for lessons and references for this subject area. At the completion of the session, a reflection page referred to a post-collaborative session reflection page (PCSR), was filled out by both the participant (Appendix E) and me (Appendix F). This page gathered narrative as to whether or not the session was productive and if our time together was spent efficiently. The very next day, the participant was asked to then complete a daily reflection in a checklist form at the end of the school day (Appendix G) as to any effects he noticed during the school day on that particular shelf that was enhanced. It included a question if the changes helped the participant in the content area, or if the participant noted any interest from the students to engage in that area of the room. There was also a section to check if there was no impact on his day. The last portion of the checklist was reserved for comments to reflect with an anecdote or more detail on any of these items. This daily reflection was completed for a total of ten consecutive school days after the enhancements were made and turned into me on a daily basis. Once the two-week period ended, the same series of steps were completed for a second area, and then two weeks
after that, the third and final area was completed. Each time, the PCSR pages and daily reflections were completed and handed in daily in the exact same fashion. This resulted in three areas being completed in a six-week total intervention period.

Upon completion of the third and final area, a final conference time slot was scheduled with the participants, each independently with me, to discuss concluding thoughts and whether or not collaboration and setting aside targeted time to make these changes in their environments was beneficial to them and to their student engagement in the targeted subject areas. Each participant and I reviewed the original self-assessment (Appendix A) and whether or not the goals set forth by the participant were carried out during the intervention successfully. Questions were also asked as to if they would be receptive to this type of collaborative work being required by administration on a regular basis and how they would design that (frequency, length of time, collaborators).

**Analysis of Data**

Several sources of data were used throughout the intervention period. This section reviews all of them in detail.

**Data source #1: participant self-assessment and rubric**

Both participants ranked their priorities of goals of what they hoped to accomplish during the intervention with a self-assessment (Appendix A) prior to the start of the study.

**Figure 1:** Frequency of total participant goals for the subject areas involved in the study
Bob’s goals were concentrated on student engagement and to better learn subject matter content, whereas Mary’s goals were focused on material making.

<table>
<thead>
<tr>
<th>Goals</th>
<th>Art</th>
<th>Geography</th>
<th>Biology</th>
<th>Mathematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bob</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Mary</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>to better learn subject matter content for this area</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>to encourage more engagement from students in this area</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>to make materials for this area that are required but not yet completed</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>to be more in line with training requirements or expectations</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 1: Ranking of Goals from Participant Self-Assessment

Because of this, more time was spent with Mary making specific materials in the geography and mathematics area of the classroom during the intervention. The prepared environment rubric scores for Mary were in the adequate to good category 100% of the time, as completed by both Mary and me.

Due to the results from the prepared environment rubric that was done by both Bob and me, his scores were in the poor to adequate category 67% of the time. All of the comments he submitted reflected a need to give attention in detail to each shelf.

Figure 2: Rubric score comparison for Bob’s classroom areas
We discussed the difference between our rubric scores. He felt strong subject matter knowledge in the math area, so gave himself a higher score on that section. Upon inspection of the shelf together, however, he realized that he had a number of materials meant for much younger students (primary ages 3-6). Games took up a great deal of space on the math shelf, rather than pedagogically approved materials from the training album. This was the main reason for the “poor” ranking I gave him in mathematics. As a result of Bob’s pre-intervention rubric, the shelves were cleaned, completely reorganized and updated to better reflect the sequencing and appropriate materials from the training photos shared and reviewed at this initial meeting.

Something else interesting from this pre-intervention data was that both participants responded on the self-assessment that they prefer to work alone when making improvements to their environment and they both preferred access to visual inspiration (photos of model classroom, for example) before making changes to their classroom environment. These responses were compared again against data source #4 with our final conference to explore if they underwent any change in attitude after working together in a collaborative way. In fact, both teachers reflected that they did indeed change their inclination from working alone to that of collaboration upon our final conversation with one another.

**Data source #2: reflections after collaborative one-hour sessions**

Once the intervention began, this data source was key in revealing reflections immediately following each collaborative session. When looking at the PCSR pages that were completed by Bob and Mary after our one-hour collaborations, it was found that the sessions were deemed to be productive 67% of the time.
Figure 3: PCSR of both teachers combined when asked if “Session was: _____.”

Two “difficult” sessions were due to the timing at the end of a long school day and Bob being sick on the other. This information was provided in the comments section of the PCSR completed by the teacher. 100% of the time, Bob and Mary felt more inclined to make changes when working with another person and had favorable comments about what was accomplished in the session.

Figure 4: Teacher inclination to make changes because of collaboration from PCSR.
Comments that both teachers provided on their PCSR pages underscored the feeling that having another person to compare ideas was helpful and would not have been done on their own if working alone. A surprising remark Bob had was that having another set of eyes on the materials gave permission, to get rid or discard any dated materials or those in very poor condition that needed to be repaired or replaced. He felt guilty or unsure of discarding of things on his own. Mary’s comments focused more on the fact that she would not have taken on the changes or material making that we did on her own during the school year. She mentioned in our time together that she preferred to do material making and changes to the shelf over longer summer breaks when out of school.

“Sharing ideas” and “collaborating together to present the geography information on command cards” that we made together during our sessions for the children were positives she shared in her comments. She was delighted that the material making goals she set for herself were seen through to completion as a result of the collaborative sessions.

**Data source #3: Daily reflection pages by the participants**

Daily reflections revealed further insights from the participants beyond the PCSR. These were specific to the subject area under consideration for the two week period and would highlight the connection to student engagement or personal reflections made by the teacher. Participants recorded at the end of each day in the intervention period their reflections on the subject area under review and the impact on their day that it had.
Figure 5: Bob’s daily reflection page results

Figure 6: Mary’s daily reflection page results

It was recorded that 43% of the time, it had no impact on their day. The participants reflected that 20% of the time, their instruction in that content area for the day was enhanced because of the extra focus on that subject area. This was reflected by the fact that they focused on giving lessons from that subject area or had students engaged in follow up work in that area. It was noted that students were drawn to and used materials from the subject area shelf that was the focus 20% of the time. The least amount of impact was that only 10% of the time, the participants considered their fidelity to Montessori principles or considered prepared environment tenets of freedom of choice by the child, independence, freedom of movement or intrinsic motivation. Another interesting observation was that anecdotal evidence provided by the participants in the comments section diminished over the length of the intervention period. The first two-week period of the intervention, Bob and Mary completed comments 85% of the time. The next two-week period, only 45% of the time did they submit additional comments or anecdotes. The final two-week period, a mere 35% of the time Bob and Mary wrote comments citing particular stories of student work or self-reflection. This indicates an
element of teacher fatigue in submitting additional information outside the parameters of the minimum checkbox format as the study wore on.

**Data source #4: final conference with participants**

At the end of the six-week period, I held a thirty-minute final conference with Bob and Mary separately during an afternoon after a regular school day had ended. This allowed for triangulation with the PCSR and daily reflection data. This confirms what data source two showed, in that collaboration was the reason that they successfully carried out the changes in their classroom. As seen in data source three these conversations reiterated what the teachers remarked during their daily reflection pages on student engagement as a result of the enhancements to the shelves. These sessions were audio recorded and followed a series of questions reflected in Appendix H. The recordings were then transcribed. Using the transcripts, themes were noted that emerged from the conversations and coding was created as shown in the table below.

<table>
<thead>
<tr>
<th><strong>Response dealt with:</strong></th>
<th><strong>Coding</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Collaboration:</strong> feelings towards working with another person to accomplish goals</td>
<td>C</td>
</tr>
<tr>
<td><strong>Student Engagement:</strong> instances when students were drawn to work on shelves as a result of the study focus areas</td>
<td>SE</td>
</tr>
<tr>
<td><strong>Fidelity to Montessori Practice/Self Reflection:</strong> instances where the teacher reviewed albums, considered new ideas to help teach material or reflected on best practices and self-improvement in subject areas</td>
<td>FID</td>
</tr>
<tr>
<td><strong>Time:</strong> Instances where time it took to make changes or meeting times came up as an issue or concern</td>
<td>T</td>
</tr>
<tr>
<td><strong>Training background of teacher:</strong> Instances when this was mentioned as an issue or concern</td>
<td>TR</td>
</tr>
</tbody>
</table>

*Figure 2:* Themes and coding used from final conference transcribed notes
Positive comments were recorded with a tick mark under the appropriate category and negative comments were also marked with a tick mark under the appropriate category. The highest frequency occurred with positive feelings towards collaboration, as 42% of the total comments were favorable towards working with others. Fidelity to the Montessori principles and self-reflection of their own teaching practices received 23% favorable comments but the least remarked on was the student engagement with the materials which received only 16% of the total comments.

![Figure 7: Totals for positive and negative comments in final conference with participants.](image)
The table below shows the tally of comments and when negative feelings were remarked, the reasoning behind it that was provided by the guide is listed.

<table>
<thead>
<tr>
<th># of Occurrences</th>
<th>Description</th>
<th>Positive</th>
<th>Negative</th>
<th>Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bob</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>7</td>
<td>1</td>
<td></td>
<td>negative: material making didn't happen</td>
</tr>
<tr>
<td>SE</td>
<td>2</td>
<td>1</td>
<td></td>
<td>negative: hoped for more results with instances of kids choosing this work from shelves/delayed response from them</td>
</tr>
<tr>
<td>FID</td>
<td>4</td>
<td>0</td>
<td></td>
<td>negative: time to do more would have been too cumbersome - had to be built into existing time at work</td>
</tr>
<tr>
<td>T</td>
<td>0</td>
<td>1</td>
<td></td>
<td>negative: NAMTA vs. AMI training differences were of concern to him</td>
</tr>
<tr>
<td>TR</td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal:</strong></td>
<td><strong>13</strong></td>
<td><strong>4</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>6</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td>3</td>
<td>1</td>
<td></td>
<td>negative: student engagement was less drastic than she thought it would be.</td>
</tr>
<tr>
<td>FID</td>
<td>3</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>0</td>
<td>1</td>
<td></td>
<td>negative: time of year may have impacted how the study results came in - sickness, adding new materials this late in year</td>
</tr>
<tr>
<td>TR</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal:</strong></td>
<td><strong>12</strong></td>
<td><strong>2</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 3:* Results from Final Conference with Participants

**Supplemental data:** pre- and post-collaborative session photographs

*Figure 8:* Photographs of Bob’s art shelf before and after the collaborative session
Only Bob’s classroom required drastic changes to the materials on the shelf as a result of his rubric score from data source one. As a result of this, there are pre and post intervention photographs available to show the changes made on each shelf for Bob’s classroom only. The photographs shown on the previous page were taken of the art area, which was the first area to be enhanced. The remaining two sections for biology and mathematics are available for review under Appendix I.

While pre-intervention photographs were taken of Mary’s classroom, since only a handful of materials were added to the shelves, there was no significant change to the look or feel of the shelves and the materials on them at the end of the collaborative session. Thus, no post-collaborative session photos were taken of her environment. Since no substantial differences were noted, ultimately the photos of Mary’s environment were not included in this study.

**Data analysis conclusion**

Based on the final conference with Bob and Mary, the biggest impact of the intervention was on their feelings towards collaboration with others in a positive way. While at the beginning of our time together, they preferred to do enhancements to their environment alone, after working together and seeing the benefits of another point of view and the ability to share ideas, they both changed to a more favorable outlook of working with others to make these changes.

When reviewing at the final conference their original goals for the study as set forth in their self-assessment (Appendix A), each teacher agreed that their goals had been met. They further agreed that they were disappointed with the levels of student engagement as a result of the study. They both hoped for a higher frequency of student
engagement with the materials on the affected subject shelves, but did not see a great deal of it, only 20% of the time. Both teachers expected this to be more significant. Bob commented that results can happen like that of the wake of a “barge rather than a speedboat.” Even though during the six-week period, we did not see a high percentage of student engagement, this may still occur beyond the time period of the experiment.

There was 100% agreement amongst both teachers that holding the teachers accountable with a pre-set meeting time with other staff members makes it more likely that each guide will accomplish goals for prepared environment improvements.

**Action Plan**

Using the results of the research acquired during the action research project, I will work with the administration at our school to continue to enhance the time set aside for collaborative work amongst the elementary teaching team. Both participants felt that once a month sessions similar to what we did during the research study could be beneficial throughout the school year with targeted subject areas covered as a group or with pre-determined questions for discussion. Not only was working on the environments helpful, but targeted and pre-determined topics that could be prepared in advance of the scheduled discussion time would be useful to the staff.

Further research could be done over a longer period of time or including the summer months and a planning strategy for working on materials before the start of the school year. Teachers could then measure student engagement throughout the entire school year based on what subject areas were focused. A more elaborate tracking system for student projects in particular subject areas could be studied to see if there is a correlation.
Creating a schedule for classroom area beautification and review of album-specific curriculum that the teachers would follow on a monthly basis during the school year could also be helpful. This would ensure that teachers would be working towards each subject area receiving targeted attention at some point in the school year. For instance, each album from the AMI training course could be assigned a month of the school year and that is the focus area for discussions with the staff and for enhancements to their classrooms. Teachers could also keep an anecdotal journal focusing on the subject area under review for that month to reflect on best practices to share with one another at the end of the time period.

One of the most valuable things I learned from this research study was that setting aside a scheduled time period and holding the teachers accountable with other staff members with whom to work makes it most likely that enhancements to environments and material making throughout the school year will be accomplished. These times spent together not only improved their environments, enhanced their teaching practices and moderately affected student outcomes, but it also served as a way to bond with fellow staff members that was not being accomplished in other forums. Teachers appreciate having these types of activities scheduled into their school day. If the time spent doing this work counts towards their required continuing education hours, the teachers are more likely to engage in these types of activities when the time is set aside with the support of the school administration.

Finally, it seems appropriate that if the teachers in a Montessori classroom are trained in the principle and truly believe it for themselves that children work best with
collaborative learning opportunities, the adults who serve them would thrive with this approach also.
References


Appendix A

Guide Self-Assessment - Pre-Intervention

Classroom Type: (Circle one) Lower Elementary Upper Elementary

Date Completed: ____________________________

I tend to like working alone to make improvements to my environment.
Yes  No

I enjoy seeing a lot of visual inspiration before making changes to my classroom environment.
Yes  No

I prefer to work with others when making a new material.
Yes  No

Please pick three areas of your classroom that you would like to have be part of the intervention period:

a. _________________________

My priority for these enhancements are as follows:
1 = most important and 4 = least important

____ to better learn subject matter content for this area
____ to encourage more engagement from students in this area
____ to make materials for this area that are required but not yet completed
____ to be more in line with training requirements or expectations

b. _________________________

My priority for these enhancements are as follows:
1 = most important and 4 = least important

____ to better learn subject matter content for this area
____ to encourage more engagement from students in this area
____ to make materials for this area that are required but not yet completed
____ to be more in line with training requirements or expectations

c. _________________________

My priority for these enhancements are as follows:
1 = most important and 4 = least important

____ to better learn subject matter content for this area
____ to encourage more engagement from students in this area
____ to make materials for this area that are required but not yet completed
____ to be more in line with training requirements or expectations

Budget for each classroom area is as follows:

a. ____________  No $ limit  $100 – 300  Below $100  No budget
b. ____________  No $ limit  $100 – 300  Below $100  No budget

c. ____________  No $ limit  $100 – 300  Below $100  No budget
Appendix B

**Prepared Environment Rubric**

Please use the following rubric to rate the classroom by each area/shelf. You will choose one for each row. The column with the most marks will be the score. The page that follows has a checklist of these areas. Use N/A if these areas do not exist in your classroom or a blank entry to describe any area that is not listed, and provide a rating.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Good</th>
<th>Adequate</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>All of materials from subject album and training center photos are available in the classroom, including all handmade materials that guide is responsible for creating.</td>
<td>All of materials from subject album and training center photos are available or set for rotation and prepared including most of the handmade materials that guide is responsible for creating.</td>
<td>Some of the materials from subject album and training center photos are missing, but these are mostly the handmade materials that guide is responsible for creating.</td>
<td>The majority of the materials from the subject album and training center photos are missing and no handmade materials that guide is responsible for creating are available.</td>
</tr>
<tr>
<td>Materials are well organized and displayed with beauty and variety.</td>
<td>Materials are organized and displayed with consideration for beauty and variety. Only a few things could use enhancement.</td>
<td>Materials are organized and displayed but not beautiful or enticing to the eye. Many items could use enhancement.</td>
<td>Materials are unorganized. Materials are dusty or dirty.</td>
</tr>
<tr>
<td>Materials are clean and unbroken and in pristine condition.</td>
<td>Materials are clean and unbroken and in good condition.</td>
<td>Materials are clean, functioning but not in the best condition.</td>
<td>Materials are broken yet still on the shelf.</td>
</tr>
<tr>
<td>Follow up work is clear on shelf and additional materials for projects are available to child for their own ideas on topic either on this shelf or on business shelf so that they may use independently.</td>
<td>Follow up work is clear and available on the shelf or on business shelf. Not specifically tied to work on shelves, but is available for them to work independently.</td>
<td>Follow up work is not clear.</td>
<td>It is unclear what follow up work is available to the child after using the material. Follow up work materials (variety of papers etc.) are not available anywhere in the classroom for the child to use independently.</td>
</tr>
<tr>
<td>All materials are age appropriate for the classroom.</td>
<td>All materials are age appropriate for the classroom.</td>
<td>There are a few materials that are not age appropriate for the classroom.</td>
<td>There are materials that are no longer appropriate for this age group displayed on the shelf.</td>
</tr>
<tr>
<td>All materials are Montessori materials.</td>
<td>All materials are Montessori materials except for a few additional items.</td>
<td>There are some Montessori materials but a larger number of non-Montessori materials on the shelf.</td>
<td>Most of the items on the shelf are games or non-Montessori materials.</td>
</tr>
<tr>
<td>Vessels containing materials show a variety of artistry and color. Effort is made to show diversity in natural materials and show objects from around the world.</td>
<td>Some of the vessels containing materials show a variety of artistry and color, but not all. Some effort has been made to show diversity in natural materials and show objects from around the world, but some items could be improved.</td>
<td>Some of the vessels containing materials show a variety of artistry and color, but not all. Some effort has been made to show diversity in natural materials and show objects from around the world, but some items could be improved.</td>
<td>Vessels are utilitarian, aesthetically displeasing, or mismatched. There is no consideration of artistry or diversity of craftsmanship.</td>
</tr>
</tbody>
</table>
### Checklist of areas of the room:

<table>
<thead>
<tr>
<th>Area</th>
<th>Rating</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biology (botany)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biology (zoology)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geography (chemistry, Earth science, physics)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geography (maps)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geometry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language (grammar/writing work)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language (novels, reading material)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Music</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other Spaces</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Shelf (pencils, paper, shared supplies)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher Storage/Desk areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outdoor Garden</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outdoor Work Space</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix C

The following photos were taken of a model Montessori classroom at the Montessori Training Center of Minnesota in St. Paul, Minnesota prior to an AMI Elementary examination being administered. The environment has all the materials necessary to carry out work from the Montessori training albums as set forth by Association Montessori Internationale. These photographs are used with permission from Elementary Trainer Alison Awes.

**Biology Shelves**
Geography Shelves
Mathematics Shelves
Art Shelf
Appendix D

The Prepared Environment
July 2, 2015
Lecture by Alison Awes

Introduction
Dr. Montessori found that the natural characteristics of children would repeatedly emerge from an environment that was well prepared. One of those aspects that makes it well prepared is the environment allows freedom: freedom to work and freedom to develop. So the ideal prepared environment must meet all of the developmental needs of the child. So the environment has to activate and support the human tendencies. It needs to respond to the characteristics of the elementary child. It needs to support independence of thinking and action. It needs to support freedoms.

A quote from Mario Montessori is:

“The prepared environment should serve as that bridge... bringing the world at large, and thus also the adult world, within reach of the child, at whatever stage of development, partial or total, he may find himself at a given moment.”

Just as the children developing have different characteristics at different planes, they also have different environments at different planes. So for example, in the primary, we have many sensorial materials, but in the elementary, we have links to imagination and reasoning.

In the primary room, we focus on individual activities, while the children prefer group work in the elementary. In the Casa, the children develop physical independence (learn to blow their nose, dress themselves, etc.). In the elementary, the children are developing intellectual and moral independence. We are stirring the intellect of those second plane children.

The first plane children experience the world, but in the second plane, we give them the universe!

In other words, the individual child has different needs at each plane so your classroom has to provide for these needs. One of the biggest mistakes that is seen during consultations in classrooms, is for the guide to have the material for the wrong plane for the children they are teaching. Meaning that there are primary materials that should not be in elementary rooms, and elementary materials in primary rooms that should not be there. It is because these materials do not fit the characteristics of the child if they are in the wrong space.

So within Montessori, we know that it is not possible to transfer knowledge from one person to another directly. We do not open the child’s head and pour in knowledge, but rather, the child has to learn through their own actions and efforts and at their own pace. That means that our role is not to be an “instructor” per se, but rather we are linking the child to the environment they are in. The environment helps the child to do her own
learning. We connect the child through stories and through materials with which the child does her own learning. Dr. Montessori says in the book *Education and Peace* that:

“The child cannot develop if he does not have objects around him permitting him to act. Until the present, it was believed that the most effective learning took place when knowledge was passed on directly to the child by his teachers. But it is really the environment that is the best teacher. The child needs objects to act; they are like nourishment for his spirit.”

The environment is not just the space or the stuff, but the environment is the community that fosters respect for the children and for the materials and for the space. Part of this community is one that includes trust and love within the community.

The adult provides freedom within certain, reasonable limits. The environment fosters purposeful work and the environment is ordered. It is ordered by subject matter. This helps the child to move and choose independently. The environment provides opportunities for socialization. There are opportunities to be a role model or to learn from a role model. Our three-year age span (cycle) supports this socialization opportunity. Older children and experienced children are demonstrating things and assisting the younger children and this builds confidence. Routine, order, consistency promotes feelings of safety and safety for each child and within the group. The children also successfully are building independence through all that they do each day.

The guide has the important task of preparing this type of environment for elementary children. The guide needs to consider the physical aspects of the environment (the inner classroom, the outdoors, the community) but also you need to consider the psychological aspects of the prepared environment. So, you need to consider your role as the adult in that environment. You are part of this community! The adult, the children, and the environment: these three elements work together to create the optimal prepared environment for development.

Here at the training center, our environment can serve as a model for us as we go out to our own classrooms, however, we will have our own space with its charms that will guide our arrangements. The environment should reflect the personality of the teacher and the children and that is why we don’t see “identical” environments all over the place. That is because we see the personality differences. However, there are certain aspects that need to be consistent in each environment. You will take into account the materials, the furniture, the space of the classroom and the outdoor spaces of the school. Also, you will establish systems for the care of these spaces.

**Materials**
You will need a complete set of Montessori Elementary materials according to the lessons in our albums. You want to give a lot of thought to the organization of your class, so that you can find things when you need them. You will need to consider the manufactured materials, the handmade materials and the other things such as glassware. We generally avoid having multiple sets of materials and that will support the
development of patience and negotiation amongst the children. It will promote variety in the classroom.

If you are in a position to select your materials, purchase them from one of the AMI manufacturers and that is because those companies have the AMI blueprints to make the materials. Having said that, it does not guarantee that these companies are following the blueprints, but suffice to say, Nienhuis, Gonzagaredi, Matsumoto in Japan are the only ones. We also want to be careful about combining sets amongst different manufacturers. It can be challenging to have certain things from a variety of manufacturers, because certain things have to match (colors lining up, sizes for containers etc.) Understand the purpose of each item you order, so that you can check the contents of the material when it arrives and check that it is meeting that purpose.

Be aware also, just because the material is sold in the Nienhuis catalog, it doesn’t mean that you need it in your classroom. There are many beautiful items that are in the catalog that are not needed. Either they are not an AMI approved material because it is not a “key” or maybe it is needed in a primary class, but not in your elementary class. You will notice a very small asterisk that will say “AMI approved material.” This is where certain administrators might encourage you to purchase something but be sure of whether it is needed or not in your classroom.

We have spoken about a lot of Primary material we don’t need. Here is just a brief review of what you will not need:
- puzzle maps
- flags of the countries
- reading analysis fixed charts

We want the children to be involved with the resource materials to find that information on the countries and flags.

You will want a great deal of hand made materials in your classroom and you will want this stuff right away. You cannot make presentations without the material and often, teachers revert to traditional ways of teaching because they do not have the handmade material, but don’t let that be you. What that means is, the first things you should make, should be the things that you need, because you can’t give the presentation another way. For example: the body function material is something you need to give those presentations. But the geometry nomenclature, you do not need to give the presentations, so that is for follow up, so those can be made later.

This is where our priorities should be structured based on answering this question: “Do I need this to give the presentations?” If the answer is no, then it can wait, but if the answer is yes – then make that material right away.

So it may be that in one year, your classroom might not be complete, but in that first year, be sure you have the things that you need to give the presentations.
You will need to purchase some other materials too such as your consumable supplies, plants, animals, glassware. In the elementary class in particular, you can’t just go to the Nienhuis catalog and order what you need, so be sure that your administration and budgeting allows for the aspect of running to Target or Petco to get the odds and ends and consumable products throughout the year.

Another aspect your classroom may need is a computer. This is a computer for children’s use, particularly in the upper elementary classroom. If you have a class of 30, then maybe two computers are necessary. The children may be required to know how to use a keyboard and type per the national or state curriculum. There may be other technology requirements, so be sure to know of these for where you teach. If you have two computers in your room, do not put them next to each other. They should not look like a computer lab, but set them apart so that they are in different parts of the room.

The children could maybe type up their rough drafts on the computer and learn how to use cut and paste functions. Alison’s preference was to have the children write their final drafts out by hand in cursive. The work of the hand and the perfection and illumination etc. really are important through these six years and should be encouraged.

In your 9-12 class, you might decide that you want the Internet available for some research the children will need to do. Sometimes the facts the children need for economic geography research used to be published in books, but they are not any longer. So they could look up the hours of the museum they were going out to, the bus schedule, or information for economics, these types of things. But we want to make sure that going out is a necessity. So we do not want the children to use the computer for easy research access. We want them to go out to see the expert, rather than “googling” what the expert said! We want them using the books for research and going to those places.

Importantly, the children do not yet understand about what is credible on the Internet. There is this assumption with the young children that if it is written down then it is the truth or that the writer is a credible source. This is an interesting thing to talk about with your older elementary children. How do we determine credibility and authenticity? Just because it is online, doesn’t make it credible or true.

**Our materials have some general characteristics in the elementary classroom:**

1. consistent color coding to support the children (math and language in particular)
2. they are made of natural materials
3. they are beautiful
4. there is a direct purpose to these items
5. they are concrete objects to provide a concrete experience to the children
6. there is control of error built into the material or we are giving the children the tools they need to control their work
7. They are manipulative, as in there is something to do with them.
8. They proceed from the simple to the complex
9. They appeal to or engage the imagination
10. They call to the children, as they were developed based on research with children and the observation of the children’s characteristics.

11. Typically there is just one of everything. There are a few exceptions as to why you might have more than one, but those are very few. In fact Dr. Montessori wrote in *The Child, Society and the World*:

"The fundamental fact in the preparation of the environment is to have only one set of each type of material. In many schools the teachers that came from our courses thought it would be better and give greater scope to have two whole sets in the school, but it became evident that the discipline of the school is hereby slackened; and if one lessens the number of sets then the discipline returns."

12. Materials are intellectually complex. They are not “Dumbed” down for younger children.

13. They are materialized abstractions such as the trinomial cube.

14. They are breakable.

15. They are precise, exact in measurement

16. They don’t distract from the concept presented. The purpose comes out and they stand on their own without gimmick or distraction

17. Things are built off of what came before. Opportunities for cross-exploration and interconnectedness are available to prepare for later work

18. Real things such as real flowers, real fruit, real specimens and using real trowels, real knives, real scalpels, real microscopes. We do not give a picture or a fake plastic model of something.

19. These objects isolate the difficulty – or isolate the one thing before we add something else to it.

So what we can notice from this list, is that our elementary environments need to be just as beautifully maintained as our 3-6 classrooms. Our children are worth it in just the same way as our 3-6 children. If the materials are not ordered and beautiful, if they are broken or dusty or in a heap in a Ziploc bag or in a corner of the shelf, the children will not want to use those things. Would you want to use those things? You will be drawn to the things that look beautiful. So the environment needs to be kept clean and it needs to be complete and it needs to be organized.

Ultimately, the maintenance and the beauty is the guide’s responsibility. So if something is dirty or broken, you need to remove it, fix it or replace it.

The children should not be distracted with clutter and you can store materials in attractive containers made out of natural materials. Having beautiful vessels is really important too.

You can provide order on the shelves, by providing a little space between items if you have enough space to do that in your classroom.
Order abounds in the elementary classroom, but it is a different type of order than what
the children needed in the Casa. So if the materials are missing, or if they are not on the
shelves, you will not give those presentations, you will skip those lessons. If you don’t
have the crown for the decimal board, or you don’t have decimal points in a container,
than you won’t be able to do the crowning of the unit! This will become a problem as
you try to work through your albums with the children and you realize more and more
lessons are not possible, as they have not built on the ones that came before if materials
are missing.

In the Casa, everything the child needed was upon a tray, and organized from left to right.
But now in elementary, the child needs to think through what she needs. She needs to
bring the materials together, so you need a space for the different papers and glassware,
so the children can think through what they need, use a tray to gather those items to be
able to do their work, but that gathering part, the child will be doing now herself or with a
group of peers.

This logical sequence can support the organization of the mind. Generally, we have
grouped each subject together and then within each subject, there is also a grouping. For
example: all the math items are together, and then within that area of shelving, all the
decimal materials are together and then the fraction materials are together. We store the
books in the area of the classroom to which they relate.

Look carefully in the practice environment at the training center as to why things are
located on certain shelves and where certain things are. Why are the parentheses where
they are, and could we put them somewhere else?

When you are arranging the classroom, consider the child’s independence. Can the child
see the object clearly on each shelf and can they reach what they need? So you need to
put shorter things in front, or not put things behind others. If there are things in closed
cabinets and drawers, then the children need to know whether or not the children can
access them should they need them.

The environment needs to promote the child’s independence. What will happen, if the
child can’t find what they need? They will abandon that work or they will interrupt you
so that you can find them what they need. Neither of these options is supporting the
child’s independence.

We will need a variety of hardy plants and animals and materials and we have talked
about this at length in our Botany and Zoology lectures. We need a clear reason for
everything we place in the environment. If we add something, ask yourself, will this be
temporary or will this be permanent? If it is temporary, then have your exit plan. It is
very easy to end up with a cluttered elementary environment so we need to be clear about
order and the children maintaining order. The order starts with us.

We will need some artifacts and specimens. We will need some art objects or things of
interest, but what trainer Margaret Stephenson said, was “don’t make your classroom a
supermarket!” Everything should be there with a purpose. You can rotate your artifacts. You could change those things periodically so that there is something new or something in a different place. This will keep the children alert as they look around the environment.

You will need to prepare your environment with all the consumable supplies, tools and equipment that the children need. So think through all of the things that the children need so that the children can make their work beautiful.

- You will want different papers for different purposes.
- You will want book making supplies and art supplies and you will want office type supplies.
- You will want different writing tools such as the inks and the pencils.
- Also, hardware supplies like the hammer and compass and screwdriver.
- You will also need cleaning supplies and cleaning tools for the children.
- You will need a plan for storage too of items such as paperclips, tickets and magnets. How will you store your glassware?
- You will want a going out shelf, as we don’t have one in the practice environment here. But think about how you are going to organize those supplies.
- Where are you going to put library books that you have borrowed from the public library?
- Where are you going to store the outdoor materials and the gardening or planting supplies or soccer balls?
- You will need your safety equipment such as a first aid kit and if you can make this accessible to the children, some Band-aides and things like that, perhaps when minor things happen, they won’t need you and they can independently care for themselves.

You will also need places that the children can’t access. You will want a place to lock any chemicals and you will need a place to store your personal items, such as a drawer or closet. And in most places, you are required to lock up children’s records. In any case, the children should not have access to these records.

Also, each child needs a permanent place to store his personal belongings. This place needs a spot for finished work and unfinished work. This needs a space for outdoor clothing, boots or coats and lunches if they bring their lunches to school.

The children should be able to access these places independently. Also, if you have a place where the children are hanging their coats or putting on their shoes, having a bench is also very helpful as well, or a grooming area with a mirror. This is a place where the child can see if they need a tissue or not.

Give some thought to the space and routines of the school and how they pertain to the environment as well. Where will the children eat lunch? What are the exit procedures in an emergency? Where is the restroom?

**Furniture and Space**
As you envision your classroom shelves, you will be able to provide everything you need for a classroom of children. Here in the practice room, we don’t have everything a child will need or a place for children to keep their work. So our stuff needs to be physically proportionate to the child. We want to consider the size and the weight of things. For instance, if an item is too heavy will the children be able to move it? We will need a variety of sizes and heights of tables because we will have various sized children, but one certainty is that you will require at least one chair for each child in the class. You can include some leisure seating such as a couch or reading chair etc. if space allows.

Be sure to leave some big areas open in the classroom for group work and for timeline work on the floor. You will want tables for group work and you will want a couple of places for individual work as well. Position the furniture so that the children can sit at the tables, without blocking the shelves or the walkways around the room. They will need free, independent movement. Keep in mind that your shelves can become nice room dividers for quieter places, but conversely, they can also become hiding places! So be sure that you have clear lines of sight, and be able to see all the children in the room at any given moment. You want the children to be able to see the work that their peers are doing, as that will support variety and inspire them.

Ideally, you want windows with lots of natural lighting, with shades or blinds when direct light enters. If this is not possible, then get full spectrum lighting. The ceiling material can also absorb sound. For your floor, you will want some areas of floor that are water resistant (bamboo, tile etc.) for messy work or science/art projects. Choose a neutral color scheme for your walls, shelves, and floors. We want the material to attract the children. You will want some open bookcase like shelves for your materials. The natural color of real wood is lovely, or you could choose a neutral paint color if it will be a painted surface. You will want to be able to move your shelves as this gives you the ability to change things around when the need arises.

The shelves in our classrooms are 36 inches tall and certain ones are 48 inches tall. 48 inches are usually too tall for a child in a 6-9 classroom, but 36 inches is a good height. Our shelves are mostly 16 inches deep so that no material hangs off (except the wooden cubing material). But this is hard to find. 12-14 inches deep is more common in the U.S., so things may hang off the shelf. What you don’t want is a children’s house height! It needs to be tall enough for those elementary age children. These are important things to think through when you are starting a new classroom from scratch.

We have approximately 400 square feet of surface shelving added together and 285 of running length shelving (so if you were to add them all together side by side, that is how much it would amount to.)

If you choose to have a desk or a table in the classroom only for the teacher, it should NOT dominate the room. It is still the child’s environment. Your desk needs to be tidy at all times and needs to be a model for the children. This goes for the closet or any other place the children are able to see. Your desk is not for you to sit at during the school day.
as you will be busy giving presentations, but certainly, you will want a place to prepare things at the end of the day or do paperwork after hours.

**Specialty Furniture that may be required:**
- You will need a special cabinet for the tone bars.
- You will need a special place for your iron material
- A place to store timelines
- A chart box
- A water source (sink) to use for art and science work. Think through where you store the things that will require a water source! You will be able to minimize the carrying around of breakable objects and liquids if you do so.

Consider carefully what you put on the tops of the shelves, and the things you put on the walls. If your space allows, keep the items on top of your shelves limited to plants, lamps, a book to display, but this will provide some aesthetic unity to your space.

On the walls, you may hang a calendar and also you will want some interesting artwork. Put your artwork in frames. Hang these items at the eye level of the children. You will want space to leave a couple of charts out after a presentation. Maybe you have some large wall clips – and if you mount these to the wall, then you can clip it up when complete with the lesson.

Do not allow the tops of the shelves or the walls to gather clutter. You want visual harmony. Do not hang anything on the walls in the classroom that you would not want in your living room at home.

The children will need places to rest their eyes on the wall as well. So these kinds of strategies will help with that unity of the space. We want the walls to be clean, neat and orderly. This means that we rarely hang the children’s work on the walls. One occasional exception is a group project like a timeline, as displaying group work on the walls allows the children to be inspired by the group dynamic and being witness to their success but also will be inspired by the information presented.

Any objects on the walls made by the children’s group need to be beautifully executed, impeccably displayed and temporary. After a week or so, take the project down. Do not be inclined to display individual children’s work as you will inevitably hurt someone’s feelings or your classroom will be cluttered with work. We do not ever single out children in our classroom, so be careful not to do this with the children in this capacity.

**Outdoor Environments**
The outdoor environment should encourage the work done inside to go out. So for example, there should be a beautiful table cleaned and ready for grammar boxes etc. The outdoor environment should also provide a place for the study of animals, plants, and opportunities for gardening with a small garden and water source outside. You may consider planting with the plant classification items in mind from the classroom. Alison did that once, where she planted things according to roots and veins. Then when you
EFFECTS OF COLLABORATION

open up the *Kingdom Vegetalia* material, there would be two types of phlox so they can tell the subtle differences when they are in that folder of the material.

You will need a large area available for large motor skills as well. You will need some access to play equipment for large motor skills and for practical life for raking, shoveling and other activities.

In all cases, the outdoor environment needs to be clearly defined for the safety of the children. So there has to be a boundary that the children know about. Also, at the elementary level, the prepared environment extends to the community for going out, so prepare the environment for going out (see ”Going Out” lectures in Theory Album.)

**Care and Maintenance of the Environment**

You will need a plan for maintenance as time goes on, and the care and maintenance of the environment needs to be the responsibility of both the child and the adult. So from the first day at school, you need to make presentations on the care of the environment to the children.

Initially, you will show the children how to use the tools, and you will show them the techniques for the various jobs to care for the environment. Do not assume that they know how to dust a shelf unless you have given a presentation on how to dust a shelf, otherwise, they may empty everything off of all the shelves or just smear the dust around without doing it properly. The supplies of course, need to be easily available for their independent use.

The cleaning routine will be very different than from the primary classroom. In the Casa, for example, there was a dusting exercise or a washing the table exercise, so the children would wash the table over and over and over and over because they wanted to do that activity, but in contrast, the elementary class, the children will clean because the room is dirty and it needs to be cleaned!

There are three stages toward the children’s independent responsibility for the caring of the environment.

**First stage:** The teacher makes a list of jobs or tasks. The teacher creates a system of the rotation of the jobs and the teacher makes the system for the accountability of the completion of the job (i.e. the teacher oversees everything)

**Second stage:** When the children are ready, you move onto this second stage. In this stage, the children make up a list of jobs. They decide how to share the jobs amongst themselves. They decide how to track that the jobs are completed and how to rotate the responsibilities.

**Third stage:** There is no formal job chart. The children see what needs to be done and they do it.
The time that you spend at each stage will vary from year to year. You should expect to begin each school year with a review and include some lessons on how to maintain the environment. After that review, established classes could perhaps start at stage 2 or 3. Some years, many years actually, you will not be able to ever get to stage 3.

So the purpose of this method is to support the child’s independence and acceptance of responsibility. There is no job chart or job wheel when they enter society! We want the children to share responsibility and we want them to think for themselves and so in this way, the three stages are connected to going out.

We are preparing the children to be responsible for when they go out. When you are ready to get to stage two, help the children understand that they need to take care of their environment and we as a community, we need to decide what needs to be done to care for our environment.

Dr. Montessori wrote in *From Childhood to Adolescence*:

> “From seven to twelve years, the child needs to enlarge his field of action…In the second periods the child needs wider boundaries for his social experiences. Development cannot result by leaving him in his former environment.”

For the 6-9 year old class, we probably come up with a list of tasks and a way to rotate or track the tasks with the children. But for your 9-12 children, maybe they just go off and do that process: they make a list and strategy for completion and then the guide merely checks in with them at the final stage. We could ask, “who is interested in being on a committee to decide the jobs and figure out how you will rotate the responsibility amongst everyone?” to get that process rolling.

The children should be able to do their chores spontaneously at any time of the day or if it doesn’t need to be done every day. Some jobs may need to be done on specific days or at times, such as recycling or animal care. Give the children time to do their job properly.

The environment is a shared responsibility, so that means that we must maintain as guides, an awareness of the environment. We want to develop the ability to walk into the class, to look and scan the shelves and see what is out of place at a moment’s notice. Your role is to make sure that the items are present and in good repair. Then we need to provide the tools to repair them or do the repairs ourselves.

You or any other adults who work with the children, can help keep the environment clean beyond the scope of the children. So what this means is that the children clean up their own messes, and they do their jobs around the class, but when the children have gone home, you can reach the fingerprints that are high up on the window and clean those. You can straighten the shelves. You don’t want to ever redo something in front of the children. They are going to do the best job they can do, but when they are gone, there are little things that you will have the skills and experience to handle and fix. This is also the time when you will check consumable supplies, like the tickets or the molasses etc.
If there is another adult working with you, if you have an assistant or another person supporting the care of the environment, when you have the conversations about the jobs, make sure that person is present also. That person needs to fully understand the routine and the organization as well. If a child is having trouble with her job, then you need to know about that, so you can help support that child.

Phyllis Pottish-Lewis, another trainer and former guide remarked once:

“When they are in charge of devising the system and means for caring for the plants, animals and materials, they become consciously aware of all that needs doing within their room. They become the owners of the upkeep when they are allowed to establish the system and take charge of it. Adults do not need to impose the system for maintaining the class. They only need to free the children to do it, and then oversee in the end that it is being done.”

Ultimately, the environment specifically needs to promote the children to be independent.
Appendix E
Participant Reflection – Post Session

Session Date/Time: ____________________________
Reflection completion Date/Time: ____________________________

Today’s session working with the researcher on the _____________ area of the room felt

*check all that apply and provide detail below*

- productive
- difficult
- ineffective

because.....

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

I felt

- more
- less
- same

inclination to make these changes when working with researcher rather than by myself

because

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Appendix F

Researcher Reflection – Post Session

Session Date/Time: _____________________

Reflection completion Date/Time: _____________________

Today’s session working with the participant on the __________area of the room felt

(check all that apply and provide detail below)

○ productive
○ difficult
○ ineffective

because…..

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________

Journal of Activity/Thoughts post session:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Daily Participant Reflection

Classroom: __________
Teacher: _____________
Date: _______________
Day of Week: ____________

By working on the __________shelf/area this week, today I noticed that:

(check all that apply)

  o it enhanced my instruction of the content area today

  o it allowed me to consider my fidelity to Montessori principles that the child has
    o freedom of choice
    o independence
    o freedom of movement
    o intrinsic motivation

  o students were drawn to and used materials from the shelf today
    o it had no impact on my day
    o other ____________________________

(Please elaborate or write on back of slip)
Appendix H

Questions for Final Conference with Researcher

Date: ____________________________
Subject: _______________________
Classroom: ________________

PERSONAL IMPROVEMENT/FIDELITY TO MONTESSORI PRACTICE
(Read from initial data collection sheet, what their goals were/compare to if they were achieved)

1. After participating in this study for the past six weeks, do you think the extra time focusing on these subject areas has benefitted you in any way?

2. How much time would you say you spent over the 2 weeks working on your subject area as a result of shining a light on it for a finite period of time?

3. Were there any negative aspects of being in the research study?

4. What can you tell me about the work that the children have done in the subject areas that were worked on during the time period of the study?

5. Has the focus on those shelves been helpful overall in encouraging them to do work from those subject areas?

6. Is there anything else you would like to tell me about the research study, positive or negative aspects of being part of it or what you’ve learned overall?
COLLABORATION

1. Has exchanging ideas with another teacher been beneficial to you?

2. Or was it just the time spent focusing on the area independently? In other words, did working with another person hold you more accountable or make it more effective?

3. Can you give me an example of the kinds of things that helped when working with another person?

4. Do you think that having a peer group such as “elementary” staff meet on a regular basis during the school year to work like this on a specific subject area and share ideas? For example: visiting each other’s classrooms to see the shelf and the work available and provide best practices to one another?

5. If so, how many times a year do you think this should be done and for how long? (for example: 1 x per month each month or certain number of subject areas per semester – or during summer cleaning time etc.)

6. What are your thoughts if this type of collaboration on your environment/improvements with fellow staff members would be required by administration as part of your continuing education hours or in service time?

7. Do you feel that this study has changed your preference for working alone to do these enhancements or would you be more inclined to work with another person in the future?

8. Has this study made you more inclined to work with other peers in the Montessori community (outside your own school staff) to enhance your environment or share ideas/best practices?
Appendix I

The following are photos taken of Bob’s classroom shelves that were cleaned and reorganized during collaborative sessions. The left side shows how the shelves looked before the intervention period and the right column shows the shelves after being worked on collaboratively with the researcher and Bob.

<table>
<thead>
<tr>
<th>Pre-Intervention</th>
<th>After Collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mathematics Shelf</strong></td>
<td></td>
</tr>
<tr>
<td><img src="image1" alt="Pre-Intervention Mathematics Shelf" /></td>
<td><img src="image2" alt="After Collaboration Mathematics Shelf" /></td>
</tr>
</tbody>
</table>

| **Biology Shelf** |
| ![Pre-Intervention Biology Shelf](image3) | ![After Collaboration Biology Shelf](image4) |