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Peer Teaching and Social Interaction

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An Action Research Report
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Abstract

The purpose of this research was to determine the affect of peer teaching on the social and academic interactions of children in an early childhood setting. The research took place at a Montessori school with two classrooms containing 56 students ages three to six. The duration of the study was six weeks. During the study the data collected included number of peer interactions per week and overall number of children working at each half hour increment of the day. Data also included positive and negative behaviors during peer teaching interactions, and the children's level of understanding during a peer presentation. Data was mostly inconclusive during this study except that the number of children distracted during the day decreased over the six-week period.

Keywords: Montessori, early education, peer teaching, social interactions, preschool

Children in a well-functioning Montessori classroom setting learn not only from the teacher and through individual experiences with the materials, but also through observation of other children working, and from peer teaching. "There are many things which no teacher can convey to a child of three, but a child of five can do it with the utmost ease" (Montessori, 1949, p. 235). Peer teaching is when a student becomes the teacher for another student; the students learn first from a teacher and then convey that information to another child through individual lessons. Dr. Maria Montessori, who developed the Montessori teaching method, described this interaction between the children as, "a natural mental 'osmosis.' Again, a child of three will take interest in what a five year old is doing, since it is not far removed from his own powers" (Montessori, 1949, p. 235). Children independently peer teaching one another is an ideal goal in a Montessori classroom. There are ways that the teacher can help encourage peer teaching and working together in groups.

General Topic of Study

Teachers working in an early childhood environment encounter daily challenges pertaining to young students and their learning that could inhibit the creation of a learning environment in which peer teaching is prevalent. For example, children are naturally different from each other and have their own personalities. There are children who are very physical and others who are very emotional. Some children are more timid and others are more boisterous. All of these traits can affect a child's relationship to his peers and his environment, and therefore the ability for the teacher to easily implement peer teaching. Observations in two Children's Houses at the same school showed many children ages three to six being social in a way that was not productive. We often

observed our students working in pairs or in groups but not in an appropriate manner. Children were often disruptive to others, distracting to their peers and themselves, and not focused on the work in front of them. This created a problem, both academic and social, in the classrooms.

Academically, this social behavior was preventing the children from concentrating and being engaged with their work and the materials, being challenged by their work, or progressing through the materials. When children who were not working at the same level were socializing during the work cycle, it caused problems, as often they were not able to choose appropriate work together and it could result in one child hiding behind a material that was not suitable for them.

The children were clearly expressing a need and desire to be near their friends and have social interactions at school. However, there was not a set a way for the children to do this during the work cycle. We believed that what we were seeing was caused by the child's need or want to socialize, in combination with a lack of direction or understanding of how to productively and appropriately work with others. Therefore they were not having successful peer relationships in the context of the learning environment.

From three to six years of age, young children acquire important linguistic, cognitive, and social skills. They are in the process of developing executive functions, which are higher order regulatory capacities such as abstract reasoning, problem solving and mental flexibility (Park & Lee 2015). While there have been some studies done with peer interactions and the effects of peer interactions on early childhood development, there has not yet been enough research to effectively show exactly how peer interaction influences social development.

According to Heid (2007), peer teaching has positive effects on intellectual and academic development. The literature shows that peer interactions are important for a child to develop socially. It also shows that peer-mediated intervention is more successful than adult-mediated intervention in terms of helping children who are struggling either academically or socially (Robertson, Green, Alper, Schloss, & Kohler 2003). While adult-mediated interventions with children can be effective, they are typically brief social exchanges that interrupt and interfere with the natural social interactions with peers. Peer-mediated interactions, on the other hand, produce more effective and longer lasting results (Brown & Odom, 1995).

Therefore, we chose to implement peer-teaching strategies that encouraged positive peer interaction as well as provided opportunities for children to grow academically by working with particular materials.

Background

Our research subjects were children in two classrooms in the same early childhood school. The children's ages ranged from three to six years old, both male and female. The classrooms each contained 28 children; combined there were 26 girls and 30 boys. Each classroom environment was prepared to foster the children's independence. The day was not structured by group lessons. Shelves were set up with various work activities that the children could freely choose to work on, either independently or in pairs or small groups, at any time they wished during the day. Their days were separated into cycles. The morning work cycle was a three-hour period of time for children to work freely. The lunch and outdoor play cycle midday for two hours - we did not record data

during this time. The afternoon work cycle was another period of work time for the children.

The purpose of this research was to determine if introducing peer teaching materials, designed for primary aged (three to six years old) children, and facilitating peer teaching opportunities would focus the children's attention on being engaged in the work, foster positive social interaction, and therefore potentially support children in reaching their academic goals.

Review of the Literature

Peer Relations

One of the reasons that early childhood education exists is for children to have experiences with other children of similar ages. Children learn how to act and respond to situations in a safe environment with the teacher as a guide. Educators create an environment in which children can learn. This does not only mean that children will grow academically and physically; they also need to grow as a member of that community.

In order to develop socially, children need to be able to interact positively with their peers (Lindsey, 2002). During early childhood, it is particularly crucial for children to develop peer-related social skills (Brown & Odom, 1995). It is essential for children to be with peers in their daily lives: playing, learning, sharing, cooperating, and having other social interactions.

From three to six years of age, young children acquire important linguistic, cognitive, and social skills. They are in the process of developing executive functions, which are higher order regulatory capacities such as abstract reasoning, problem solving and mental flexibility (Park & Lee 2015). These, and more, are all related to social,

cognitive, and academic domains. For example, developing the ability to be in control of your attention and impulses will relate positively to social behaviors and peer relations. For children to develop these skills, it is necessary that they be given the opportunity to practice through real life experiences. In early childhood education children are in a setting where they are naturally interacting with peers and reacting to situations. This includes conflict, friendship building, verbal and nonverbal communication, sharing physical space, and cooperation (Park & Lee 2015).

Social skills are "socially acceptable learned behaviors that enable a person to maintain relationships and interact effectively with others" (Park & Lee 2015, p. 577). Through these real-life experiences, children will gain social skills that lead to a higher level of social competence.

Social Competence in Early Childhood

Having the skills to develop social competence creates the building blocks for positive peer relationships and friendships. "Social skills that facilitate peer relationships consolidate in the preschool years, during which time peer groups become structured with respect to friendship groups, gender, and dominance relations" (Hay, Payne, & Chadwick 2004, p.84). It is during these important peer interactions that children learn to resolve conflicts, share, and communicate with another person (Park & Lee 2015). When children are accepted socially and form friendships early in their education, Lindsey (2002) stated that it is beneficial for their academic performance. In comparison when a child does not form these early positive peer relationships, it can lead to negative attitudes about school and lower levels of academic performance. Additionally, Kennedy

(2013) found that when peer interactions were successful, the child had a higher level of readiness for future academics and higher social emotional abilities.

Many adults, and more commonly parents, have emphasized the importance of a child's ability to progress intellectually and academically (Johnson, Ironsmith, Snow, & Poteat, 2000). Especially at this young age, a more appropriate focus for education is teaching awareness and tools for productive social capability. This higher capability directly influences their academic development in a positive way (Johnson et al, 2000).

Children are born into an ever-changing world in which they must learn how to successfully live. Social competence means understanding the rules, routines, and expectations that exist in a society or community. Gaining these necessary skills is key in order for a child to develop in his environment (Kennedy, 2013). A child learns based on how he lives in his world. "The child incarnates the environment which he finds around in himself, and constructs a man adapted to live in those surroundings" (Montessori,1955, p. 85). If given the ideal opportunities and experiences needed to develop fully, a child will become more socially competent.

Working with others can positively or negatively affect a child's learning, motivation, and participation with peers (Rietveld, 2010). Preschoolers can be too egocentric to be successful in collaborating with others. According to Park and Lee (2015) their egocentrism makes it difficult for them to cooperate and manage both the social and cognitive skills required for collaboration. However, children of this age are becoming increasingly more interested in interacting with other children. Meaningful interaction in social and cognitive activities with others is a driving force behind individual development. In this way the early childhood educational setting is similar to

the larger, adult society. Each person develops as an individual and contributes to the community.

Peer Teaching

A common goal of creating an inclusive community in early childhood educational settings is for children to feel comfortable and become increasingly confident while interacting with peers (Rietveld, 2010). "In order to understand the role of peer interaction in cognitive development it is suggested that you examine situations in which the children are in charge of their own situations" (Williams, 2001, p.318). Children learn from each other.

Working with a peer enables children to feel safe and supported while learning. Heid (2007) suggested that pairing children together creates a sense of caring and an atmosphere of community, collaboration, and trust emerges. Heid (2007) found that once the two children paired together recognized that they were both safe working together, they were able to move on to learning a skill. The more experienced peer was able to present and articulate concepts to the younger learner in a personal way that would not have been possible with a class of 20 students and one teacher. Greater learning was achieved in the presence of a more experienced peer.

Robertson et al (2003) described four different types of peer-mediated interventions. The first is when peers support each other by encouraging and supporting behaviors. The second is peers modeling appropriate responses. With the third type, peers teach academic and developmental skills. The fourth and last type deals with peers participating during group activities and demonstrating cooperation. With each type, peer mediation was more beneficial to the children than adult intervention. "An important goal

for research, then, is to develop peer-mediated procedures that are easy, natural, and enjoyable for children to fulfill with minimal levels of adult assistance" (Robertson et al, 2003, p. 184).

While adult-mediated interventions with children can be effective, in comparison to interactions with peers, they are brief social exchanges that can interrupt and interfere with the natural social interactions with peers. Peer-mediated interactions, on the other hand, produce more effective and longer lasting results. In addition, the peer-mediated strategy is enjoyable for the children involved and is now the most widely used method (Brown & Odom, 1995). There have been several peer-teaching methods used in the early childhood setting. Brady (1997) implemented a procedure for peer tutoring based on one peer modeling behavior and the other imitating it. Another model investigated whether or not pairs of children that were led by a socially advanced child improved the child's social skills and cognitive achievement (Park & Lee, 2015). Brady studied peer teaching with pairs of children and recorded the effects of the individual child academically. Brady also studied other pairs of children, but instead recorded the following, "Positive initiations, including positive motor-gestural and vocal-verbal expressions directed toward the peer; negative initiations, such as hit or shout directed toward the peer; positive responses, negative responses, and length of interaction between children" (Brady, 1997, p.133).

Based on previous studies done with peer teaching, there has been no direct correlation shown between peer teaching and a change in social interaction. Peer teaching did show positive effects on intellectual and academic performance (Park & Lee 2015).

However, peer teaching is only one aspect of peer interactions that children can experience.

Conclusion

While there had been some studies done with peer interactions and their effect on early childhood development, there was not enough research to effectively show how one influenced the other. "Because of the critical nature of young children's peer interactions and peer-related social competence, early childhood educators have argued for the explicit inclusion of social interaction and social competence curricula in early childhood preschool programs" (Brown & Odom, 1995, p. 38). There were many works focusing on why peer relations are important at this age. Unfortunately, on the topic of peer teaching in early childhood, there have been few studies conducted. Many of the studies focused on older children or children with disabilities, either social or developmental. "Addressing the social competence and interaction skills of young children is an ongoing process that involves continuous planning, teaching, assessment, and reflection throughout the year" (Kennedy, 2013, p. 24). In order to fully understand children's peer interactions and effects of peer teaching on children ages three to six, there needs to be more research.

Methodology

Before we began our research intervention we observed for one week to collect baseline data. We used the same forms before and during the research process. This gave us some information about peer teaching in our classrooms that we used as a guide for the rest of our intervention. It told us initially what the children's relationship was to peer teaching before any changes were made in the classroom.

We then implemented a set system of peer teaching. During the first week of our action research, during the afternoon work cycle, we gave lessons on how to invite another child to a presentation, how to give a presentation to another child, and how to ask for a presentation from a peer. These are referred to as grace and courtesy lessons and were done as a large group, one each day. These lessons were designed to help the children learn language they can use to positively interact with one another in a peer-teaching situation. This large group consisted of children who did not nap in the afternoons. We also used this week to present one of the new works each day to certain children we identified as being able to be a peer teacher. These were not new materials to the environment, but they were new presentations (activities) using those familiar materials– such as extensions or games that were meant to build on the initial presentation. The presentations were in the areas of practical life, sensorial, language, and math.

These peer teachers were children who had previously demonstrated that they could be successful with that material based on information collected through teacher observations. We presented the materials to less than six children per activity. Each material was presented to different peer teachers to increase the amount of peer teaching opportunities in the classroom. At that time, we explained to the peer teachers that they could choose other children outside the group to present to. The experienced child chose a partner who had not yet received a presentation from a teacher on the material.

Along with introducing each peer teaching material to the children we also encouraged and promoted peer teaching among the children. For example if we saw that

a child wanted to learn something new, we would suggest that they reach out to a peer teacher instead of an adult.

After implementing a peer-teaching plan for the children, we used several techniques for collecting observational data. The first data collection tool that we used was a tally sheet that showed which children worked together each day (Appendix A). We used this to see how many children were participating in peer teaching activities and how often. We could compare the weeks and see how the number of children working in pairs increased or decreased comparatively.

The second type of observational data that we completed was a scale with which we measured the peer learner's level of understanding of the material (Appendix B). We used this when children were engaged in peer teaching to determine how well the information was conveyed and understood. We could tell when a child was displaying low, average, or high levels of understanding during the presentation based on whether they could successfully repeat the activity or not. Usually during a presentation, the teacher shows the learner how the material is used then gives the learner an opportunity to repeat on their own what they were shown. If a child was able to repeat the work correctly without any obvious mistakes, the understanding was marked as high. An average level of understanding for a child receiving that presentation for the first time would be if the child understands what the objective is but may not be able to accomplish it on the first attempt. We did not expect a child to repeat the lesson perfectly on the first try, nor was that realistic in a classroom. A low level of understanding was if the child either did not understand the goal of the work or could not complete the work in any way. This could include damaging or misusing the material in a way other than the intended

use, for example, if they used a clay bead-making material as imaginative toys and did not attempt to make a bead.

We also recorded how many children in the whole classroom were engaged in work each half hour (Appendix C). We recorded the number of children that were engaged in peer work, individual work, or who were distracted and not working at each given time interval. Working independently meant that the child had work out, and was concentrated on that work without help from a peer or teacher. Working in pairs meant that children were working together; they were either involved in peer teaching or in collaborating with a peer to accomplish a task. If children were not working, wandering through the room, socializing, or were distracted from the work they had out, it was marked as not working/distracted.

From this information we could see if there were certain times when children were more inclined to work in pairs, individually, or not at all. We also used this chart to see the change in peer teaching interactions over the course of our research.

The final tool was a form that included a behavior log of how the children were interacting socially during the peer teaching lesson (Appendix D) We planned on using this tool to perceive and record who initiated the engagement, how long they collaborated on each two-person material, and in what manner they worked with the material; positive or negative. For example, a negative verbal response between children working together would be, "I don't want to work with you." A non-verbal positive response would be that the children were smiling together and having a quiet conversation about the material.

We quickly realized during our research that this final form was not realistic for us to complete because it required that we observe the entire interaction between peers

and we could not observe more than one interaction at a time. With a room of more than 20 children, it was not possible for us to complete this and also have an accurate representation of peer teaching in the classroom. Instead of recording the beginning time, each positive or negative response, and the end time of each interaction, we recorded if the interaction overall was positive or negative. If there was a negative response at all, such as a physical contact or a child walking away, the entire interaction was deemed negative. By doing this, we could still determine whether the peer teaching increased or decreased positive social interactions between the children. We decided that the time length of each was not relevant to our data results.

  We observed daily from 8:30 a.m. to 11:00 a.m. and again from 1:30 p.m. to 3:00 p.m.: the morning and afternoon work cycles. The children engaged normally with the environment and each other. They worked with the materials as they did on a typical school day with the added dimension of peer teaching. After the peer learners learned the material from a peer teacher, they could use the work as they normally would individually. If we saw that a child was repeatedly presenting the material incorrectly to a peer, we gave an informal update to the presentation to improve the weaknesses of their presentation to other children. This could be as simple as a teacher approaching the child and giving suggestions on how to improve technique to make the child more successful. For example in the art activity, the teacher could point out that the beads the child was making were too large and show them the correct size of a bead. In language, if the child is saying the incorrect vocabulary, the teacher could say the correct vocabulary and point to the picture to bring awareness to the child.

Data Analysis

There were 28 children in each classroom with an average of 26 in attendance each day. In the afternoon work cycle many children were not present in the classrooms so the total number of children is less with an average of 16 children being observed for the data. You can see this with Figures 1.1-1.6 when the numbers drop significantly after 10:30 am. We also did not record data during our lunch and recess hours, from 11:00 am until 1:00 pm. During these times the children are not working with the materials in the classroom so it would not have affected our data in any way.
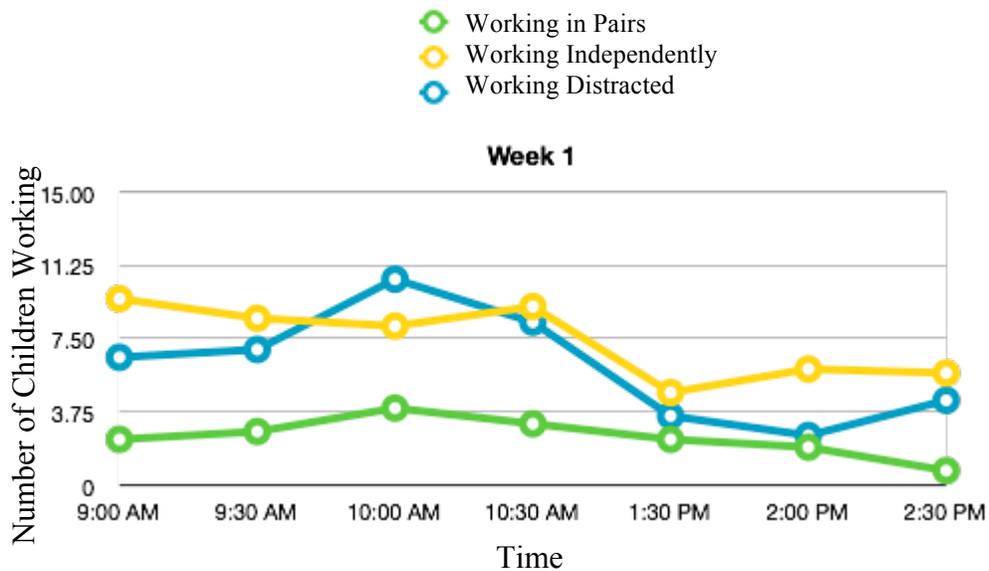
Figure 1.1
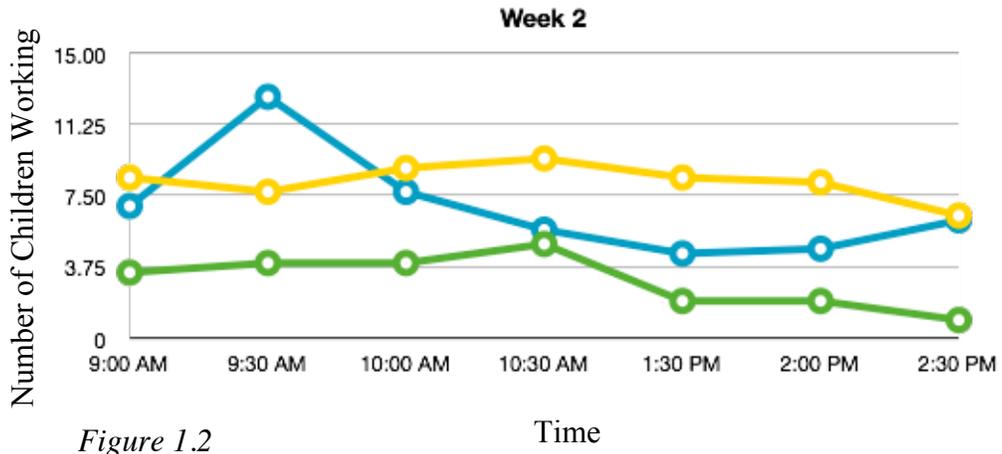
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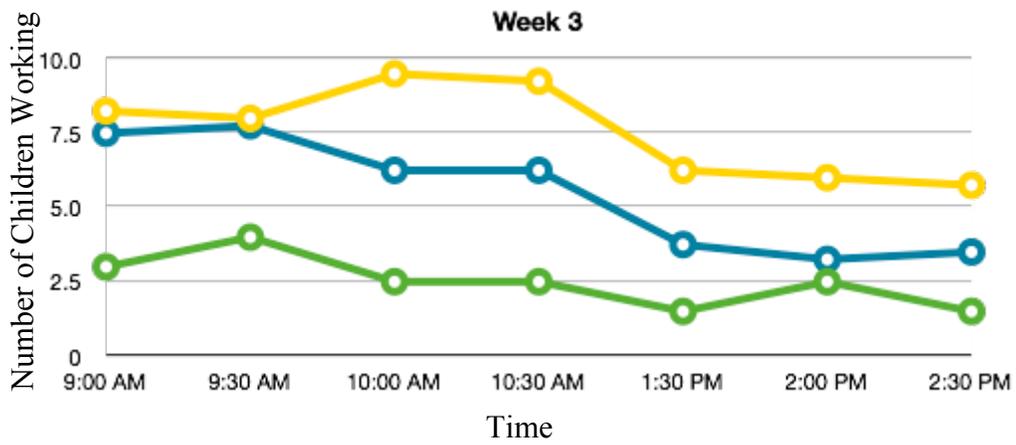
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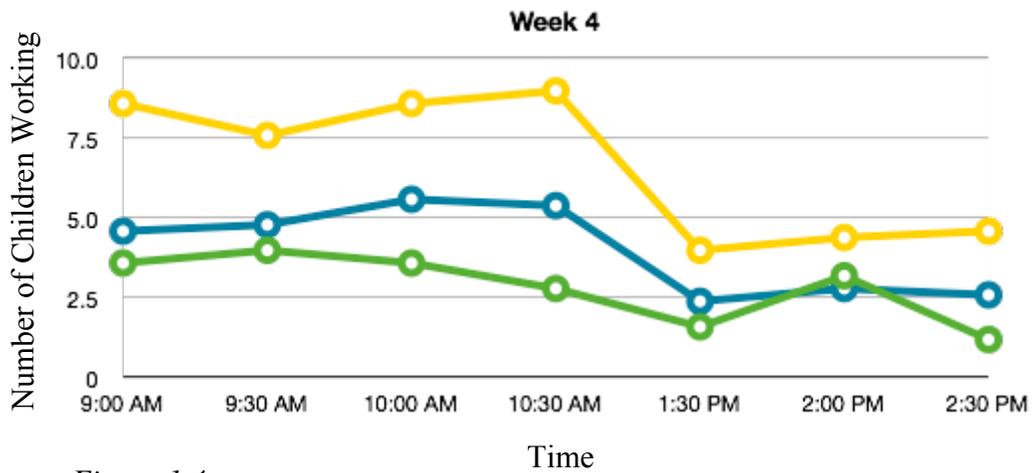
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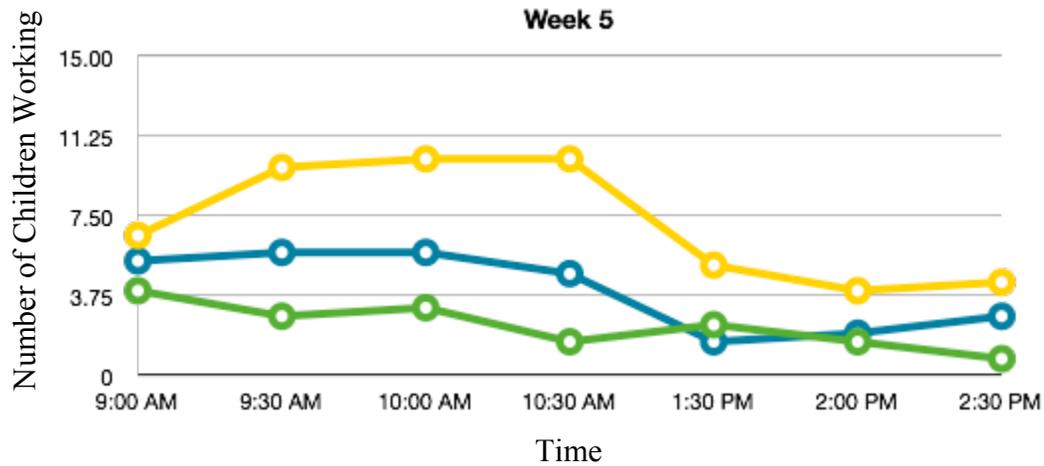
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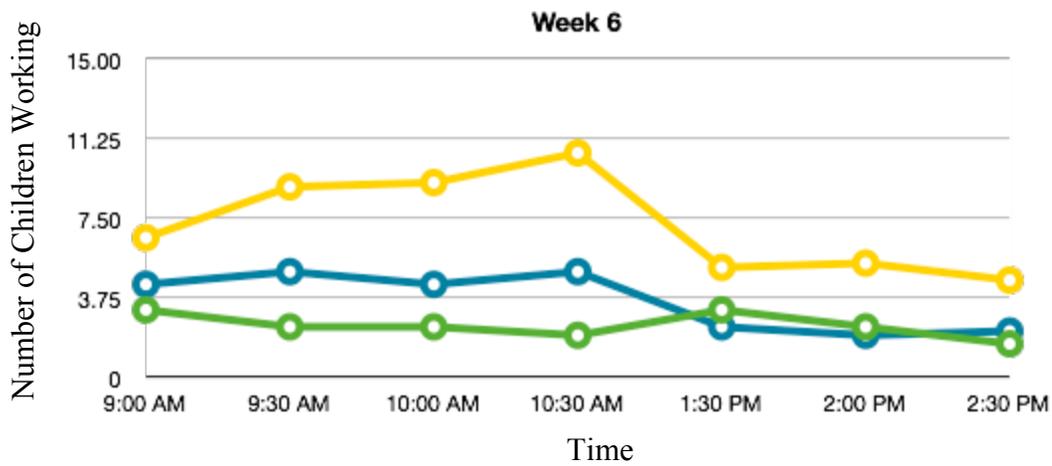
Figure 1.6

Figures 1.1 - 1.6: Average number of children working independently, in pairs, or not working/distracted at half hour intervals throughout the school day, averaged over the five days of data collection each week.

We collected this data throughout the six weeks of our intervention and averaged the numbers for both classrooms each week to create the figures above. As you can see from the figures, looking specifically at Week 1 (fig. 1.1) versus Week 6 (fig. 1.6) there was no change dramatic enough to conclude that our intervention affected the number of children working in pairs. The data varied each week, but the only data that visibly improved was the lower numbers of children that were distracted. For example, in week one, the highest average number of children distracted was 10.6, while in week 6 the

highest average of children distracted was 5. We also observed this change in the general demeanor of the children and activity level in the classroom. By week six the data shows that there were more children actually working, either independently or in pairs, than children distracted at most times in the day.

Peer Interactions Table

WEEK	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
TOTAL	60	78	67	89	96	112

Table 1: Total number of peer interactions per week during our intervention.

Table 1 illustrates that the total number of children engaging in peer interactions over the course of our six-week intervention increased. We observed that overall, the children were more prepared and more comfortable asking each other for a peer teaching lesson; they seemed less dependent on the adults in the room and more readily sought peer help instead of coming directly to a teacher for help.
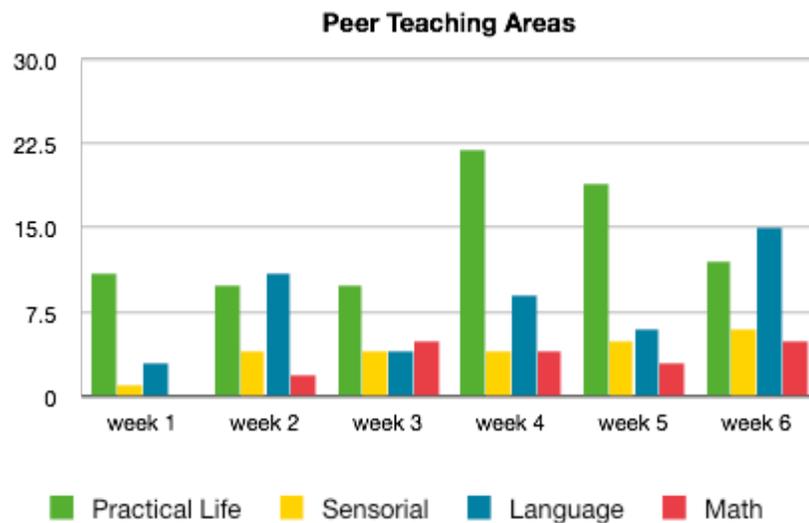
Figure 2: Peer interactions in each learning area of the classroom.

Figure 2 is a breakdown of learning areas in our classroom, and the number of peer interactions that occurred in each area during each week of the intervention. It is interesting to see which areas lent themselves more naturally and effectively to peer teaching. Peer teaching occurred more in the areas of practical life and language than in the areas of sensorial activities and math. Practical life includes work that children will naturally do in life such as cleaning, care of plants, food preparation, and art. These lend themselves well to peer teaching as they are acquired naturally through a child's experiences in the environment. These works do not necessarily have a right or wrong answer, like math and language, and so the children have more flexibility in how they teach it to a peer. Children will master these practical life works as they gain fine and gross motor skills, the ability to concentrate, and the ability to follow sequence. Sensorial activities pertain to specific experiences based on the child's senses. These technically cannot be taught, as the child has to develop their senses naturally. When the adult teaches these materials they will alter the presentation to best fit that child's learning style and level of development. This is more difficult for a peer teacher to accomplish. It is understandable why there would be less peer teaching interactions in this area.

Language can lend itself well to peer teaching because it is more naturally suited to group work. For example, many language works are based on spoken language cards with images. These images have coordinating vocabulary. Once a child can understand and identify each image with its vocabulary, it is fairly simple for them to teach other children the same work.

Math is based on numbers and has a correct and incorrect answer associated with each work. The first math material in a Montessori classroom is introduced around the

age of four. Prior to this first math lesson children need to have experience with other

specific materials in the classroom. Since the math materials are geared towards the older

children they are not as accessible for peers to teach one another. This is apparent in the

data showing low numbers of peer teaching interactions in the math area.

    During each peer teaching interaction we observed and recorded how successful

each peer teacher was based on how well the peer learner repeated the work. The data we

collected reflected the number of peer interactions and the learner's level of

understanding of the material presented by the peer teacher.
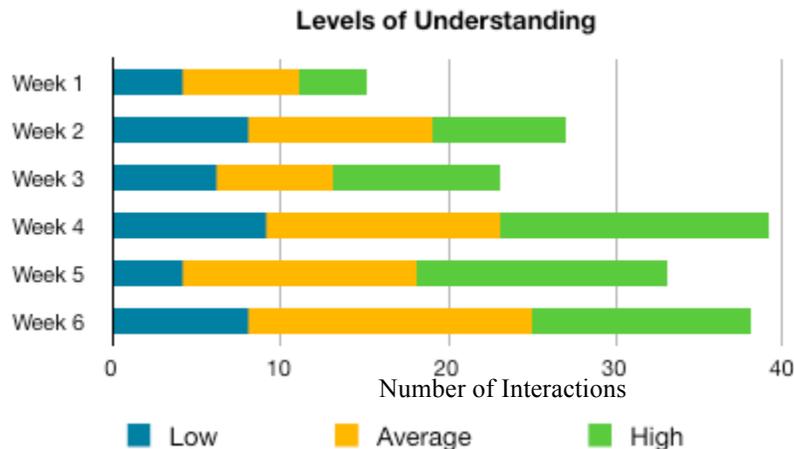
Figure 3: Graph showing the total number of interactions per week and the child's
level of understanding.

    Figure 3 illustrates that the number of interactions increased over the six-week

period. However, the percentage of low to average to high understanding in each week

did not change drastically. For example, the percent of high understanding went from

27% in week one, to 29.5% in week two, to 43.5% in week three, to 41% in week four, to

45.5%in week 5, and finally 34% in week 6. There is not a consistent increase from week

to week, but overall there was an increase in the number of peer teaching interactions in

the last three weeks compared to the first three. However, because it was not substantial

or continuously incremental, we cannot conclude that our intervention had a direct effect

on the level of understanding by the learner in peer teaching.
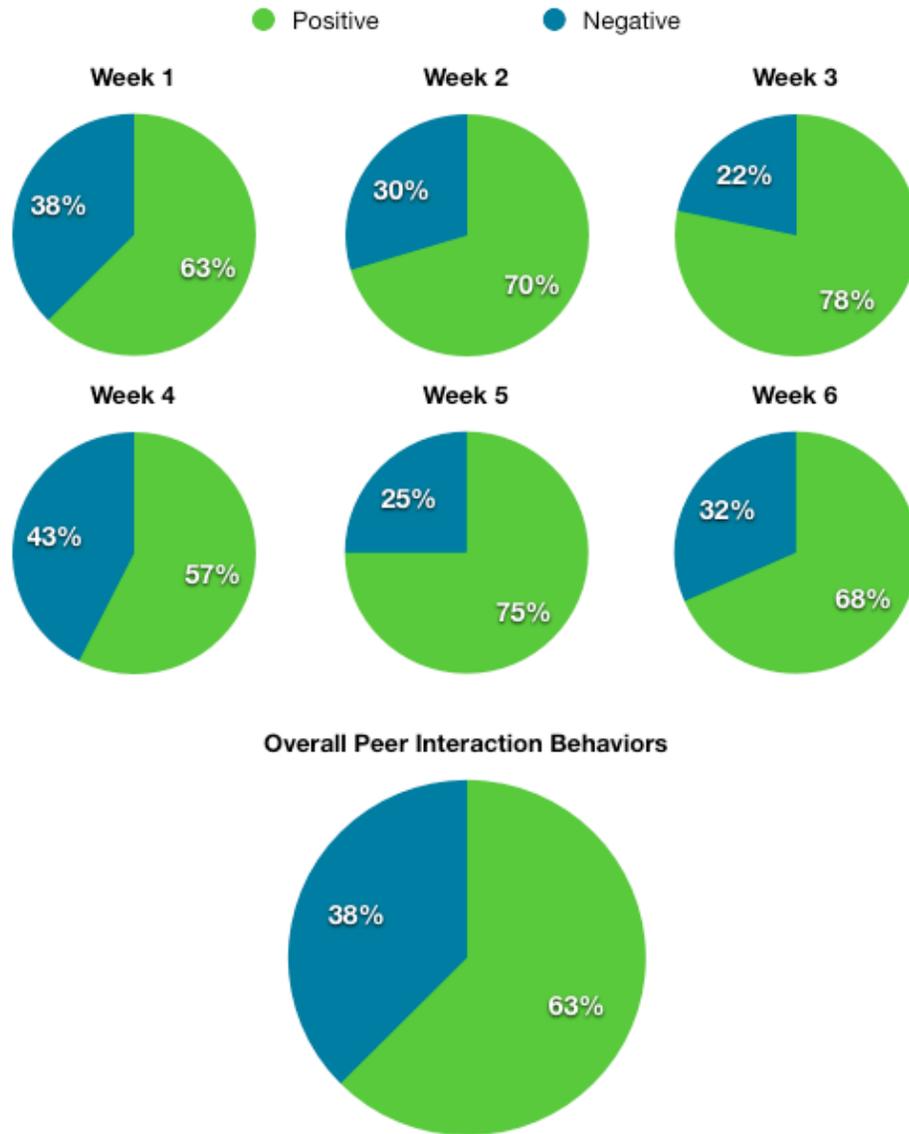
Figure 4: Graphs showing positive versus negative interactions between peer learners
and peer teachers over the six-week intervention and overall.

        While we observed what each peer teacher was teaching, how well the peer

learner was understanding the material, and how often the children were working with

each other, we also recorded whether the children's interactions were positive or

negative. As seen on the Behavior Log (Appendix D), we recorded when each interaction

was positive or negative based on both verbal and nonverbal cues. Positive verbal cues

were when the children used kind words in their dialogue and correct language was used

in presenting the material. Positive nonverbal cues were noted positive reactions to the

peer teaching: smiling, laughing, sitting near each other, hugging, and signs of listening

like nodding. On the other hand negative verbal reactions were harsh or hurtful language

between children. Negative nonverbal cues were hitting, pushing, hands on hips, pouting,

walking away from the lesson, not sharing the work, etc. With each interaction we

decided whether it was either positive or negative overall. In Figure 4 you can see that

overall most of the interactions were positive. Our intervention did not seem to cause a

change in the percentage of positive versus negative behaviors in the children.

Conclusion

Overall, the results of our research on the affects of peer teaching on early

childhood interactions were inconclusive. While the number of children that were

distracted during the day did decrease, the number of children working in pairs remained

the same. Peer teaching was more often shown in certain academic areas of the classroom

than others, but there was not an increase in the levels of understanding of the materials

overall. Socially, the results of this intervention did not cause a change in the overall

percentage of positive and negative interactions between the children in the classroom.

The most encouraging result of the intervention was on the children's ability to be

more independent as learners. After encouraging peer teaching, we found the children to

be less dependent on the adults in the room for help.

Action Plan

Our intervention had marginally successful results. We presented peer-teaching materials to the children in effort to provide an outlet for positive peer interactions, both socially as well as academically. We found that encouraging peer teaching was positive in that the children were more independent within the classroom. One of the basic goals of the Montessori pedagogy is the development of independent learners. Therefore in a Montessori classroom environment, the development of independence is facilitated and children are expected to make choices for what material they work with throughout the day. Over the course of our intervention the number of children focused on independent work improved and the number of children who were engaged in distracting behaviors went down.

We noticed positive shifts in social behaviors as a result of the intervention. An example of this is that by encouraging peer teaching we were also helping the children to build a community where they would seek help from one another, or work together to solve a problem, rather than immediately asking for help from an adult. The biggest thing for us was to observe how the children responded to working with each other. If we saw certain patterns in the children's actions that required attention, we addressed them by giving lessons in grace and courtesy. For example, if we saw that the children were having a difficult time asking another child for help, we gave a presentation on how to ask a friend for help and gave specific language to use.

Materials we found worked the best for peer teaching within our intervention were in the areas of practical life and language. We would suggest only certain subjects or specific materials that the children could teach each other in order to ensure success.

We found that overall the children still needed to be guided by an adult in the process of peer teaching: We would often offer suggestions of materials that two children could work together on that we felt they could be successful with. However, in order for the intervention to be more successful, the peer work should be a more natural, integrated part of their learning. Children should be able to work together on a material without asking an adult for help or permission.

Based on results from our intervention, there are some variables that could have affected results. First, the ages of the children in the class could have an effect on the results. The more older and experienced children there are, the greater the number of children who know the materials in the classroom and therefore would be able to successfully teach a peer. If a classroom had all younger, inexperienced children, there would not be as much opportunities for peer teaching. These children have not yet learned the concepts well enough to teach them to others. Another factor that can affect results is the number of children and adults in the room. In a Montessori classroom the adult presence should be minimal so the children can be more reliant on each other than the adults, thus encouraging peer teaching. In our study the lead teacher to student ratio was one to 28, with one or two assistant teachers in the room depending on the time of day. These assistants did not give presentations but were present for classroom support.

Our project could be adapted for any classroom, where there are many opportunities for children to work independently and in pairs and the teacher gives small group lessons, not relying solely on whole group instruction. In a Montessori classroom, the teacher only gives lessons to individuals or small groups of children and the children are free to choose their work based on interest. This gives many opportunities for peer

teaching since the teacher can only be with a few children at once. Therefore, if a classroom is structured differently, and the children are not free to choose work or to work in small groups, implementing this strategy might be difficult.

We started implementation of our project in February, not at the beginning of the school year. It may be helpful to start an intervention like this at the beginning of the school year or soon afterwards. This way it would be less of a departure from the everyday routine of the children during their work cycles. However, by starting the intervention later in the year there would naturally be more potential peer teachers available because more children would be experienced in working with the materials.

We held a natural bias based on the fact that we had already been working with these children on a daily basis in the classroom. We already knew how children reacted to adults and each other so we could almost predict how they would act in a peer teaching interaction. Our observational data might have been influenced by these views. An outside, objective researcher may view the results differently based on unbiased daily observations. This is not to say that the results would be different but it would be beneficial to have another view outside of the classroom staff. Along the same lines is the fact that this intervention took place in two classrooms at the same school.

If we were to do this research again we would focus more on grace and courtesy and defining for the children what peer teaching is and less on the specific materials that were being used. We had four specific areas of the classroom that a Montessori environment is naturally divided into. Although this was interesting and we found that the children's focus was in one area over another, we do not believe that this is necessarily

important in terms of peer teaching success. Choosing work that is more natural to the children and easier to teach is a key aspect to success.

The area that we would suggest observing more of is the overall moods and energy level in the classroom.

A question for potential future research is did the peer teaching affect only certain children? It may be productive to identify a certain number of children that are having trouble with social or academic success and implement peer teaching with them only, observing them over a longer period of time. We identified a problem based on the needs of certain children in the classroom, but not all children had this need. If the researcher had included only the children who were struggling, it may have resulted in more conclusive data. In our research, children who were not having trouble in these areas may have skewed the data since they weren't the target subjects. Also, a longer period of data collection could possibly offer more information and perhaps different results. Since our research showed that early childhood peer teaching had more of a positive effect on social aspects of the classroom than academic development, we believe that this shows an opportunity for further research in this area. We cannot yet tell what the direct effect of peer teaching is on the student's academic success. This may take a more intense study over a longer period of time to determine. Social effects can be seen more clearly in a shorter amount of time and we have seen this with our small study. Hopefully other educators can use what we have learned in our classrooms and achieve even better results.

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Appendix A

Child Pairing   Date ____/____/____

Child	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	■																											
2		■																										
3			■																									
4				■																								
5					■																							
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28																												■

Appendix B

Peer Learner's Level of Understanding   Date
____/____/____

Peer learner: _____   Peer teacher: _____   Time: __:_____ am / pm

Material (circle one):   Practical Life   Sensorial   Language   Math

Level of Understanding (check one):   High   Average   Low

Notes:
☐   ☐   ☐

_____
_____
_____
_____

Peer learner: _____   Peer teacher: _____   Time: __:_____ am / pm

Material (circle one):   Practical Life   Sensorial   Language   Math

Level of Understanding (check one):   High   Average   Low

Notes:
☐   ☐   ☐

_____
_____
_____
_____

Peer learner: _____   Peer teacher: _____   Time: __:_____ am / pm

Material (circle one):   Practical Life   Sensorial   Language   Math

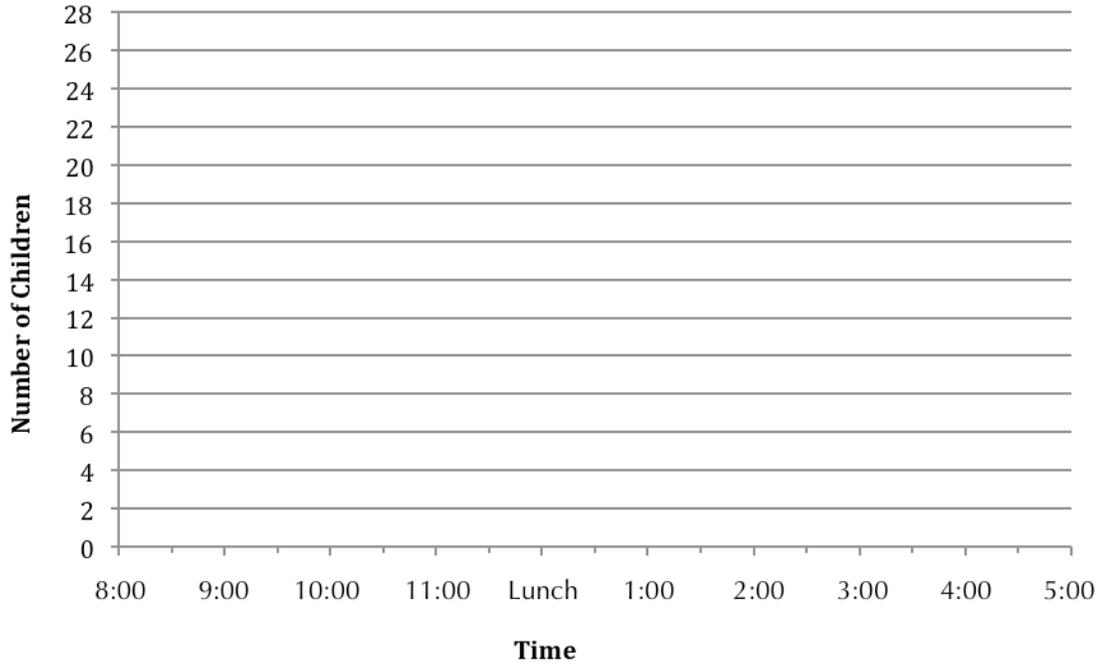Level of Understanding (check one):   High   Average   Low

Notes:
☐   ☐   ☐

_____
_____
_____
_____

Appendix C

Whole Classroom View   Date____/____/____
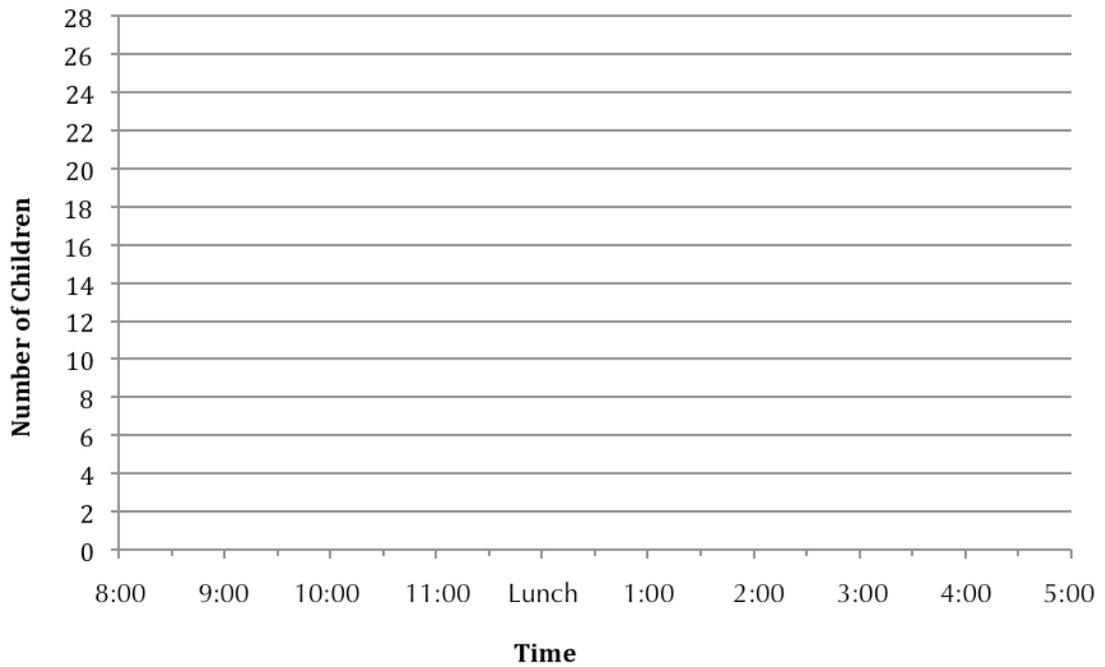
Number of children in class this day: _____

Chart each 30 minutes while the class is in a work cycle.

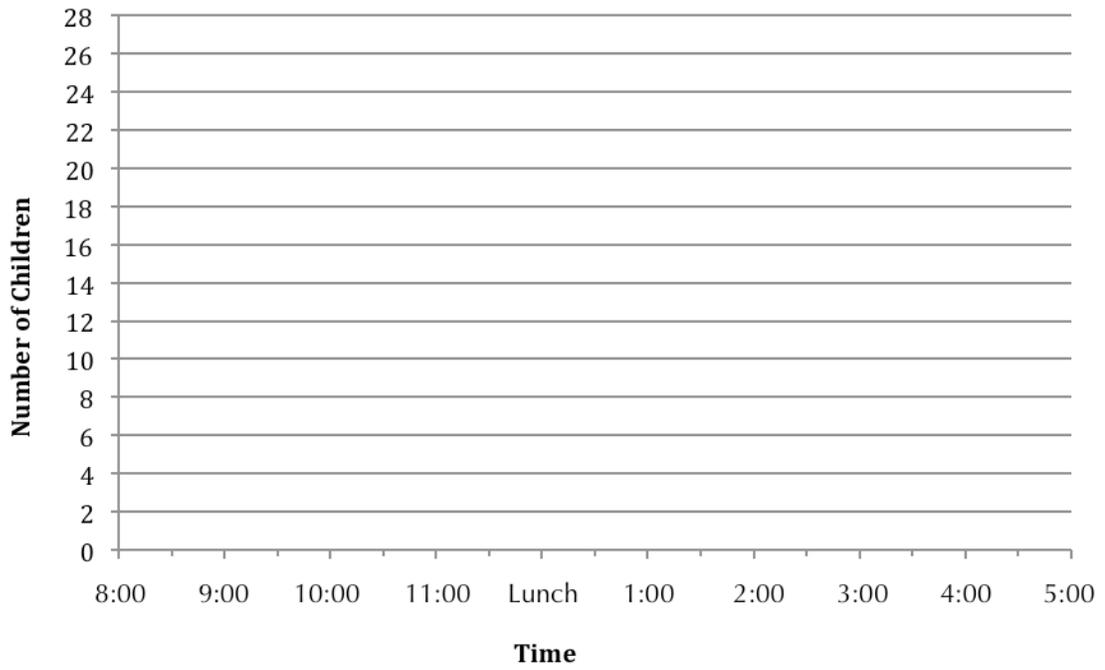Children working in pairs:

Children working independently:

Children distracted:

Appendix D

Behavior Log   **Date____/____/____**

KEY: *PV= positive verbal   NV= negative verbal   PN= positive non verbal   NN= negative non verbal*

Peer learner: _____   Peer teacher: _____

Material (circle one):   Practical Life   Sensorial   Language   Math

Behavior (in box record KEY abbreviations that you witness):

Start time: | | *End time:*
_____ am / pm   _____ am / pm

Notes:
_____
_____
_____

Peer learner: _____   Peer teacher: _____

Material (circle one):   Practical Life   Sensorial   Language   Math

Behavior (in box record KEY abbreviations that you witness):

Start time: | | *End time:*
_____ am / pm   _____ am / pm

Notes:
_____
_____
_____

Peer learner: _____   Peer teacher: _____

Material (circle one):   Practical Life   Sensorial   Language   Math

Behavior (in box record KEY abbreviations that you witness):

Start time: | | *End time:*
_____ am / pm   _____ am / pm

Notes:
_____
_____
_____