

CHAPTER 2

REVIEW OF LITERATURE

This literature review has been organized into seven sections: biography of Maria Montessori, pre-Montessori education and the birth of the Montessori method, the three levels of the Montessori method, current research on Montessori, Montessori as an international curriculum and its implementation in the United States, Montessori today and future implications, and Montessori's impact on child development.

Biography of Maria Montessori

Maria Montessori was born in the province of Ancona on August 31, 1870. Her father, Alessandro Montessori, was descended from a noble family from Bologna, and was a military man and typical conservative of the old school. Her mother was Renilde Stoppani, niece of the famous philosopher-scientist-priest Antonio Stoppani. Renilde was a pious and charming woman, and between mother and daughter there lied a resemblance in both appearance and temperament, as well as an affection and understanding (Standing, 1957).

At age 12, Montessori's parents moved the family to Rome in order to provide their daughter a better education. But even with the educational advantages of this metropolis, this ambitious young girl was not easily satisfied (Standing, 1957). Montessori grew up in a time when teaching was one of the few professions open to

educated women, and her father urged her to follow that path. Montessori, however, showed from an early age that she was a fiercely independent and assertive woman, and insisted on attending a technical school. There she studied mathematics and later obtained a degree in engineering, a profession unthought of for a woman and hardly the typical women's role her father had wished for her (Shute, 2002). After completing her degree, she became interested in biology, and finally decided she wanted to study medicine and become a doctor. Unfortunately, a woman attending medical school was unheard of and considered impossible. Montessori, however, was determined and persistent, and after finally managing to obtain an interview with the head of the Board of Education, she was admitted to the university and became the first female medical student in Italy (Standing, 1957).

Once admitted to the university, Montessori's difficulties were far from over. The male students were jealous of her and persecuted her for months. She was shunned to the point of being allowed to perform dissections only at night, alone, because it was unthinkable for men and women to view a naked body together (Shute, 2002).

Montessori, however, was steadfast and unwavering, and overcame these difficulties. In 1896, she became the first woman in Italy to receive the degree of Doctor of Medicine, and the same year began speaking as an advocate for working women, becoming well known and attending conferences in Berlin and later in London. She also spoke out against the exploitation of child labor, and along with this advocacy one of Montessori's traits – best described as fighting on behalf of the underdog – emerged (Standing, 1957).

Along with speaking as an advocate, Montessori worked as assistant doctor at the Psychiatric Clinic in the University of Rome. Part of her duties involved visits to the

Rome asylums for the insane, where she encountered many feeble-minded children living alongside insane adults (Bloom, 2004). Although these children were often also labeled as deficient and insane, most were more likely autistic or retarded. In one of these asylums, Montessori came across a group of these children and noticed the woman who looked after them was doing nothing to conceal the disgust with which she regarded them. When Montessori asked her why she felt this way, the woman replied, ““Because as soon as their meals are finished they throw themselves on the floor to search for crumbs”” (Standing, 1957, p.28). Observing them, Montessori realized the children were starved not for food but for stimulation. Locked all day in barren rooms, there were no objects in their environment to hold or manipulate. In playing with these crumbs, she realized, the children were striving for the only means of stimulation within their reach. The more Montessori worked with these children, searching for ways to help them, the more she came to differ from the generally accepted views pertaining to them. Through reading widely in philosophy, anthropology, and educational theory, she had come to believe that their mental deficiency was a pedagogical problem rather than a medical one (Shute, 2004). She also believed that with special education their condition could be treated.

When developing these ideas, Montessori’s main influences came from Jean-Marc-Gaspard Itard and Edouard Seguin, two French doctors whose investigations were aimed at developing techniques for educating mentally handicapped children (Wentworth, 1999). Itard had worked with the *Wild Boy of Aveyron*, and his writings provided Montessori with a dramatic confirmation of the importance of a child’s environment. Seguin’s work with handicapped children and his development of many

materials for them to use provided Montessori with materials to use with children as well as ideas for the development of her own new materials (Chattin-McNichols, 1992).

In 1899, at a pedagogical conference in Turin, Montessori expressed her belief that “defective children are not extrasocial beings, but are entitled to the benefits of education as much as – if not more than – normal ones” (Standing, 1957, p.29). This novel point of view aroused much interest in Italy at the time, so much that the Minister of Education invited Montessori to deliver more lectures in Rome on the education of the feeble-minded, which laid the foundation for the development of a state orthophrenic school, which Montessori directed from 1899-1901 (Standing, 1957). It was here that Montessori worked with all of Rome’s hopelessly deficient children, and later all of the idiot children from Rome’s insane asylums she had previously visited. In the two years she was director Montessori worked tirelessly. Her days were spent working with the children and her nights were spent evaluating how the children responded to the materials and readapting them (Standing, 1957). Experimenting with various materials, she developed a sensory-rich environment, designing letters, beads, and puzzles the children could manipulate, and simple tasks such as mat weaving that prepared them for more challenging ones. After two years of never-ending work, many of these “feeble-minded” children could read, write, and pass standard public-school tests (Shute, 2004).

Though acclaim and applause greeted this seeming miracle, Montessori remained focused and deep in thought. “Whilst everyone was admiring my idiots, I was searching for the reasons which could keep back the healthy and happy children of the ordinary schools on so low a plane that they could be equaled in tests of intelligence by my unfortunate pupils,” she commented (Standing, 1957, p.30). The more deeply she

thought, the more she came to feel that the cause lay in a difference in education principles. If retarded children could conquer such exams, what results would her methods have on normal children in traditional classroom settings? “I became convinced that similar methods applied to normal children would develop and set free their personality in a marvelous and surprising way” (Standing, 1957, p.30). When Montessori visited these traditional schools, she found students “like butterflies mounted on pins, fastened each to his place, the desk, spreading the wings of barren and meaningless knowledge which they have acquired” (Shute, 2004, p.3).

These visits, combined with a combination of ideas from theorists Jean-Jacques Rousseau and John Locke, gave Montessori the means to form the basis of her philosophy on the child. From Rousseau she brought the ideas that the child is inherently good, is a lover of work, and learns best by experiencing the consequences of his or her own actions. In addition, they both saw the environment around the child, both physical and social, as the method of choice for change rather than direct instruction or other more traditional methods of teaching. From John Locke, Montessori drew an emphasis on the “education of the senses”, and the idea that the mind of a child is empty at birth these sensory experiences are what fill it up and form the basis of simple ideas, which are then built upon to form complex ideas (Chattin-McNichols, 1992).

Having developed a basic philosophy following her work with deficient children, Montessori now needed a chance to apply it to the normal children she believed needed her help. This chance came in 1906, when she was asked to organize a program for children in Rome’s San Lorenzo quarter. It was an area of squalor, poverty, and crime where, because the parents were away at work and the older children at school, all the

younger children were left to their own devices. To occupy themselves, the children – described as “ignorant little vandals” – played up and down the stairs and corridors of the buildings, defaced the walls and generally created disorder (Standing, 1957, p.36). Having accepted the responsibility for these “little vandals”, Montessori got to work fitting up the room that had been set aside for them in one of the buildings. With limited money for expenses, she had child size tables and chairs made instead of the desks that were universally in use at the time, and brought in some precise scientific materials similar to the ones she had used in the institution for defectives. For other materials such as toys, Montessori needed extra money, and asked society women for donations (Standing, 1957).

The Casa dei Bambini, or Children’s House, opened January 6, 1906. Montessori described her new students, ages two to six years, as

Sixty tearful, frightened children, so shy that it was impossible to get them to speak; their faces were expressionless, with bewildered eyes as though they had never seen anything in their lives . . . poor abandoned children who had grown up in dark tumbledown without anything to stimulate their minds – dejected, uncared for. It was not necessary to be a doctor to see that they suffered from malnutrition, lack of fresh air and sunlight. They were indeed closed flowers, but without the freshness of buds . . . (Standing, 1957, p. 37-38)

This description would soon change, however. As Standing (1957) puts it, “in the whole history of education, from the time of Plato to the present day, there is no episode more remarkable than the series of happenings that came tumbling in to being, one after the other, in the next six months” (p. 39). Almost immediately, Montessori noticed that the children came to prefer her teaching materials to toys, and would spend hours arranging cubes to build a tower or putting wooden cylinders into holes. If the children chose the toys at all, their interest in them disappeared soon after, supporting Montessori’s (and

Rousseau's) theory that children have a natural love for work and prefer it to play. She also noticed that as they worked, they became calmer and happier. As the months passed, Montessori modified materials and added new activities such as gardening, gymnastics, making and serving lunch, and caring for pets (Shute, 2004).

Montessori soon realized that the key to these children's ongoing interest and success was in the materials she had provided, and in the fact that these children were able to choose their materials themselves and chose to use them spontaneously. From this freedom of choice she saw blossoming in these young children an amazing mental concentration, a love for repetition of the same activity, and a love for order and putting materials back in their places themselves (Standing, 1957).

The children at Casa dei Bambini, now thoroughly enjoying their stimulating school environment, soon began asking Montessori to teach them to read and write. So, using an idea adapted from Seguin, she devised sandpaper letters that they could touch and trace, pronouncing the sounds of the letters as they did so. In time, the children naturally discovered that one can analyze spoken words into their component sounds, and that those sounds were the ones they had learned in connection with the symbols. They then could spread out the letters and arrange them into words, and soon after could use the tracing skill to write out the letters to form words. When taught to write in this way, the children were able to feel as though they weren't being taught at all, but were learning all on their own. In the words of one of Montessori's students after writing his first words, "I can write, I can write, but nobody told me how! Nobody told me how!" (Standing, 1957).

From this new skill of writing emerged the necessary skills for reading, which followed naturally several months after. Sensing her students were close to being able to read, Montessori wrote on the blackboard little notes such as “If you love me, give me a kiss” or “If you can read this come to me.” For several days, nothing happened, but on the fourth day, a girl came up to her and said *eccomi* (here I am) and a short time after another came up and gave her a kiss. These children had discovered the essence of writing – that it transmits human thought – and from that day on eagerly awaited the arrival of any new messages on the blackboard (Standing, 1957).

These are just a few of the amazing revelations which were manifested to Montessori and her assistants by the disadvantaged children on San Lorenzo, and word of these revelations was spreading fast. Before long, stories of these wonderful children had traveled all over Italy and then all over the world. Acolytes from around the world flocked to Rome to witness what was happening in the Casa dei Bambini, and as a result of these visits, Montessori schools began popping up in various countries, including England, India, the United States, and China. Montessori was impressed by the universality of the appeal that was made by the life and behavior of her students, and explained this appeal when she said it was because, “each visitor seemed to find there the embodiment of his own ideals” (Standing, 1957, p.56).

To accompany her fame, Montessori soon became sought after for lectures, training and interviews. Although she would have preferred to go on living as she had been living, she felt a responsibility for spreading her philosophy that could not be avoided. In 1909, the first teacher training course in the Montessori method took place, and soon after she began writing a series of books and articles describing her approach.

Over the next 40 years, Montessori worked tirelessly, traveling all over the world in her never-ending crusade on the behalf of children's rights, liberation, and giving them the best education possible. At her death in 1952 at the age of 81, Montessori was still traveling and involved in writing and giving presentations. Having accomplished so much in her life, Montessori will forever be remembered for many things, but in the words of her colleague and friend E.M. Standing, her "most lasting monument is, and always will be, the serene and joyful atmosphere which emanates from thousands of happy children in every part of the world" (1957, p.72).

Pre-Montessori Education and the Birth of the Montessori Method

By the time Montessori arrived onto the scene, Europe had acknowledged many innovators in education. As noted above, among her pedagogical predecessors were the philosophers Locke and Rousseau and the doctor-therapists Itard and Seguin. However, when Montessori visited the schools of Western Europe in the early 1900's she found the actual conditions relatively unchanged over the past two hundred years. The essential requirements for a school were considered to be a teacher, some students, a curriculum, and a room to contain them. She witnessed forced immobility, inadequate light and ventilation, and rote methodology – to her, these conditions added up to a form of slavery (Loeffler, 1992). In her own words, "It is incomprehensible that so-called *science* should have worked to perfection an instrument of slavery in the school without being enlightened by one ray from the movement of social liberation, growing and developing throughout the world" (Bloom, 2004, p. 194).

In order for education to be improved, Montessori claimed, one of the things needed was a change in the current view of the child as being just a miniature adult, and

the pressure to become an adult as quickly as possible. She sought to liberate children from this view and the teaching methods associated with it, and replace it all with a new theory based on the idea that the brain of a growing child is different from that of an adult, and therefore the educational environment must support where the child is developmentally (Montessori, 1964). Through study and experience, she had developed the idea that the growing person over time experiences dramatic changes, which she organized into four stages, or planes: early childhood (0-6), middle childhood (6-12), adolescence (12-18), and early adulthood (18-24). Taking it a step further, Montessori theorized that within these planes, especially within the planes of early childhood and adolescence, a person is absorbing and learning vast amounts. When it comes to learning a specific skill such as language acquisition, she proposed, there exists a certain sensitive period – or window in development – within each of us which urges us to focus our attention on certain aspects of our environment to the exclusion of others. Montessori maintained that these special sensibilities and interests stem from a genetic component available to all children, and if taken advantage of at the right time will result in rapid development in that skill and establishment of a new function, in this case language development leading to speech. The degree of development depends upon timing and the child's experiences with their environment (Standing, 1957).

Montessori's discovery of the importance of timing and the environment on children's learning led her to believe that the current environment of the classroom was not meeting children's needs and needed a complete overhaul. Included in this overhaul of the environment would be not only the physical surroundings – the indoors, outdoors

and materials – but also the “psychical” or psychological conditions within it (Loeffler, 1992, p.32).

Finally, Montessori saw a need for a different kind of teacher in the classroom, one who would take a supporting role and employ the science of observation while letting the materials of the improved environment take center stage (Montessori, 1964). The result of all of these concerns and ideas for changing Europe’s current educational system was the creation of the Montessori method.

The Three Levels of the Montessori Method

The various parts of the Montessori method can be divided into three levels. At the top level we have theory and philosophy, the background of Montessori’s ideas which are the rationale for her model of education. As a result of her background in mathematics and biology, Montessori approached the study of children from a scientific perspective. Through her scientific observations, she was able to make remarkable discoveries which at her time had been overlooked by many others who approached the study of children and education differently. These extraordinary discoveries and realizations formed the basis of Montessori’s theories and philosophies.

Montessori believed that the view of the child as a miniature adult and the pressure on children to grow up as quickly as possible ignored the four planes of development and the sensitive periods in the life of a child, and allowed no freedom for exploration. Based on her studies and on her experiences with the children in Rome, Montessori thought that the basic atmosphere for the educational process should be liberty and freedom, and children should be encouraged to explore and investigate at their own pace (Standing, 1957). This idea – liberty and freedom as an educational base for

children – is at the heart of the Montessori method, and falls under the over-arching theme of respect for the child. To her, the purpose of education was to develop a free and respectful child who would enter into society with an open mind and heart and who would make a difference in their world and change it for the better. Montessori recognized that the only way to raise a child who is respectful of others is to provide them with a respectful environment. In looking at the important aspects of the Montessori method that follow, it is the theme of respect which underlies and brings them together. Another important piece of the level of theory and philosophy is Montessori's ideas on the importance of providing manipulative materials for children to use in the classroom, which she discovered when visiting the asylums and put to use at Casa dei Bambini (Chattin-McNichols, 1992).

Just as her background in science influenced her theory and philosophy, the ideas of Montessori at this top level determine the content of the next level, the Montessori model. The model contains the information on the ideal Montessori classroom, and includes recommendations for construction of the environment, the role of the teacher, and teacher expectations. The first of these subjects Montessori tackled had to do with the environment of the classroom. Building on her philosophy of respect for the child, Montessori developed her own ideas about what the structure of the educational environment should be like. She believed that “to liberate the child we must reform the environment . . . The new school must be absolutely suitable to the minutest detail, to the developing soul” (Chattin-McNichols, 1992, p. 32). She started with the psychological environment, striving to create a positive atmosphere in which children are respected as competent individuals who construct their own knowledge through exploration and

discovery. She wanted children to express their own interests and feel free to choose their own activities rather than have the entire class be led by the teacher through the same activity (Loeffler, 1992).

After developing what she thought to be the ideal psychological environment, Montessori set out to redesign the macro-environment, which included aspects such as classroom design, choice of furniture, shelf height, and placement of curriculum and materials (Chattin-McNichols, 1992). Montessori's main change from the traditional classroom of the time was that she designed the classroom environment to suit the child, not the teacher. Based on her theory of respect, she believed the classroom should meet the needs of the children and foster self-direction and independence, rather than meet the needs of the teacher and foster reliance and dependence (Montessori, 1964). On the walls Montessori hung low blackboards and pictures of "simple scenes in which children would naturally be interested" (Montessori, 1964, p.82). She did away with the typical school desks of the time and brought in child size tables and chairs, and instead of using tall, usually locked cabinets to hold curriculum and materials she opted for low shelving that was accessible to the children. She believed that if the children were able to spontaneously choose their own work and return it when they were finished, sense of pride and love of order would develop in them, and their self confidence and independence would be fostered (Standing, 1957).

To Montessori, however, new and wonderful psychological and macro environments were not all that was needed. The overall environment of the classroom would not be complete without the micro environment – the materials used in the classroom. After all, what purpose can new child-accessible shelves serve without

interesting and appropriate materials to draw the children to them? When choosing and creating her materials, the goal she had in mind was to attract the child, enable the polarization of attention, and then motivate spontaneous, self-directed exercise (Montessori, 1964). She made it clear that not just any material would do; each of them must be carefully designed and intended to isolate and embody a motor skill, perceptual quality, or concept, and then must be determined in quality and quantity by experimental research (Loeffler, 1992).

One of the key ideas behind the development of Montessori's educational materials was the design characteristic she called "control of error" – a factor that leads the child to notice and correct him/herself. When using self-correcting materials, the teacher does not need to be there with the child to tell him/her whether they have gotten it right. The materials themselves will tell the child whether they are being used in a correct way (Chattin-McNichols, 1992). The use of self-correcting materials may leave visiting observers puzzled about how the children are able to work on their own without the help of a teacher, and wondering, "How do they know how to do all these things since nobody seems to be teaching them?" Montessori would say the answer lies in these carefully developed materials. When properly used, each of them opens up new vistas of experience, revealing new wonders in the world around the child, wonders which have always been present but have until now remained unnoticed. This is why Montessori refers to them as "keys to the universe" (Standing, 1957).

Now that she had developed what she considered to be an ideal educational environment for children, Montessori set out address the next issue in her model – to redefine the role of the teacher and teacher expectation. As noted above, Montessori

believed children should be treated with respect and should be granted freedom and independence in the classroom, and she considered her self-correcting materials to be the “keys to the universe”. As a result of these beliefs, she came to see the role of the teacher as one who formulates both the physical and psychological environments to facilitate children’s independence of action, thus freeing them to learn through their own efforts (Loeffler, 1992). She is more of a guide or facilitator, rather than a director spending most of her time teaching the entire class from the front of the classroom that most people would envision. Within Montessori’s concept, a teacher actually does very little teaching of the class as a whole as is often done in traditional schools, and allows the children to be self-directed and free to choose their own activities – the conditions under which Montessori believed children learn best. It is not that the teacher is a passive force, but must “guide the child without letting him feel her presence too much . . . always ready to supply the desired help, but never the obstacle between the child and his experiences” (Montessori, 1964, p.131).

When the Montessori teacher does interact with the children, she favors one-on-one interaction and tailoring lessons about materials to each individual child’s needs (Chattin-McNichols, 1992). Montessori explained the role of the teacher as such as one who respects a child’s concentration and who, once a lesson is given, does not intervene either to correct or encourage:

‘She must give her lesson; plant the seed in the soil, and then slip away; observe and wait expectantly but not interfere . . . If the material interests him, the child will repeat the exercise and this repetition of the exercise develop not only intelligence but also character . . .’ (Wentworth, 1999, p.32).

In her writings, Montessori often referred to the child as a “little explorer” with a never-ending curiosity for pursuing activities that interest him (Standing, 1957, p.327). It is the job of the Montessori teacher, she believed, to assist this little explorer *indirectly* in his researches by supplying him with the means to find the answers to his questions by himself.

Once she had established the role of the teacher in the classroom, Montessori got to work developing the final component of the second level of the Montessori model – a set of expectations that are reasonable for the teacher to hold about appropriate behavior for the child. The main focus of this set of expectations lies around the concept of discipline, or rather self-discipline. When working with the children in San Lorenzo, Montessori saw first hand how when given the freedom and opportunity to choose work they found interesting, the children ceased to be troublesome. Using this information, Montessori came to believe that self-discipline is a part of the general spiritual health of a child, and that when placed a respectful environment that stimulates mind and body, disobedience ceases to have any point and disappears. She believed that “naughtiness and disobedience of the child are the expression of a vital conflict between his creative urge and his love for the adult who does not understand it” (Wentworth, 1999, p.53). The key in achieving self-discipline, she claimed, was giving children freedom of action, for “the child who has never learnt to do things by itself, to control its actions, to master its own will, later turns into an adult who is easily led and who needs the support of other people” (Wentworth, 1999, p.54)

The third and final level of the Montessori method is the level of the program. We have seen the ways in which Montessori’s theory and philosophy determined the

content of her model, and it is in this next level that we see how the model is applied to real life programs. Programs represent the implementation of the model, and have actual children and teachers in them. Thus, they are much more variable than the model, because they represent the results of one teacher's interpretation of the Montessori model in which she has been trained. Though each is based on the same model, because of these different interpretations each Montessori classroom will differ in teacher variables, class composition, and other factors (Chattin-McNichols, 1992). However, in each classroom there should exist a basic idea which underlies the whole of Montessori's philosophy of education which Wentworth (1999) identifies as,

“the affirmation of a need for the development of creativity and spiritual freedom in the child and consequently in every teacher and everyone else in society. Freedom, after all, is the essence of life, necessary for the development of the mind as much as air for that of the body. Hence, true, deep education cannot take place without it. Our whole life, in a way, is but an educational process that people must continue throughout their lives if they want to survive as rational beings. But to learn truly and deeply, one has to be free, like Montessori children” (p.110).

These three levels described above – theory and philosophy, the Montessori model, and Montessori programs – comprise the Montessori method. It is important to note, however, that the method was not fully developed during her time working with children at Casa dei Bambini. Montessori was a lifelong scientist, and throughout the rest of her life she continued studying children and making further realizations which she incorporated into her method.

Current Research on Montessori

In reviewing the current research that has been done on Montessori education, studies fall into one of two categories: process research – what actually happens in Montessori classrooms – and outcome research – what has been learned about the effects of Montessori schooling on children. When examining the process research that has been done, most of the studies involve comparing the school environments that correspond

with different teaching methods. One of the most important of these process research studies came from Miller and Dyer (1975). The study took place in several phases, the first of which being random assignment of the 248 child sample to one of four preschool treatments: Bereiter-Engelmann, traditional, DARCEE, and Montessori. The Bereiter-Engelmann program is a heavily didactic program with a behavioral orientation. The Darcee program incorporated both direct teaching and time for children to use cognitively oriented materials. The traditional program was based on the usual nursery school practices, and represents a typical Head Start program. There were four school sites, and four replications of each program, except the Montessori program, for which there were only two replications (Miller & Dyer, 1975).

Miller and Dyer first conducted an examination of the different philosophies of the four models, by having teachers report their agreement with a list of statements derived from each model. This part of their study showed that the teachers did have very differing views of the goals of preschool education. Next, consultants rated the classrooms on a variety of measures to determine how well they represented their model. Finally, both live and videotaped observations were conducted. This effort to determine how accurately each classroom represented its method is one of the exemplary features of the study. Miller and Dyer grouped their results into five categories and presented a graph for each. When it came to children's physical activity, the Montessori program showed the highest incidence of manipulation of materials, the lowest incidence of motor activity, and the second highest incidence of role play (a somewhat surprising finding to those who believe Montessori classrooms are low in role playing). The next category was verbal child activities. Again, clear program differences, predictable from the

models, can be seen. The Bereiter-Engelmann program showed the largest amounts, followed by the Montessori program with moderately large amounts. The traditional and DARCEE models showed low amounts of recitation. Despite the perception of little social behavior in the Montessori classroom, it was here that Miller and Dyer recorded the highest amount of conversation, a finding that was reinforced by Back (1977), discussed later.

When it came to group time, Bereiter-Engelmann showed the highest amounts, and Montessori the least. DARCEE and Montessori showed equally high amounts of time alone. In examining teacher behavior, Bereiter-Engelmann showed the highest amount of asking behaviors, with Montessori showing the least, while Montessori was the highest in giving information. Montessori was the only group in which more giving occurred than asking. The final category recorded pertained to reinforcement. Results showed that the behaviorally oriented Bereiter-Engelmann program had large amounts of positive and negative reinforcement occurring, while the Montessori program provided more positive reinforcement than the traditional program, and less negative reinforcement.

Overall, the results of the Miller and Dyer study, though complex, indicate that in most areas Montessori classrooms are as Dr. Montessori described them decades ago. The children work with materials, often individually, the teachers very seldom give group lessons, and little conduct control is needed from the teachers (Chattin-McNichols, 1992).

Back (1977) took Miller and Dyer's study of children's social interactions in Montessori classrooms a step further. She compared classrooms at each of three schools representing British Infant School and at three more representing Montessori. It was

found that the Montessori children had a higher ratio of peer interaction even though their activity was less play-oriented. Apparently, they were more likely to work together in non-social situations. When examined against the theories within the Montessori method, this finding coincides with Montessori's view that work with materials leads to increased self-confidence which eventually results in mature social interaction with other children.

Baines and Snortum (1973) also examined the social behaviors of children in a Montessori school, and compared them to the behaviors of children in a traditional public school. Mirroring the findings of Miller and Dyer, they found that while the traditional school children spent over 90% of their time under direct supervision of the teacher, the Montessori school children the largest percentage of time in self-directed study. In addition, one of their most interesting findings was that the Montessori children spent sizable amounts of time teaching and being taught by each other.

To summarize the findings of the process research on Montessori, it is clear that Montessori schools continue to reinforce the belief in limiting the time spent on group instruction, instead encouraging the students to move about the classroom, choose their work, and work individually. While it has been shown that Montessori children do spend significant amounts of time conversing, a high portion of this is either in regards to schoolwork or actual peer teaching (Chattin-McNichols, 1992).

After examining the current process research on Montessori education, one is able to move on to the current outcome research – what has been learned about the effects of Montessori schooling on children. In an attempt to clarify and organize the large number of studies that have been conducted, the results are presented in several subsections:

general verbal intelligence; perceptual, motor, and performance IQ development; academic achievement and school readiness; attention, concentration, resistance to distraction, and impulsiveness; self-esteem, self-efficacy, and prosocial behavior; and finally longitudinal studies (Chattin-McNichols, 1992). Suggestions for future research conclude this section.

Studies of general verbal intelligence have shown the benefits of a Montessori education. Stodolsky and Karlson (1972) investigated changes in performance on the Stanford-Binet intelligence test over an eight-month span among 29 low-income and 29 middle-income preschool children who were in their first, second, and third years of attendance in a private Montessori school. They found that all the children in their first year at the school showed a statistically significant gain in the Stanford-Binet IQ from pretest to post-test. This result has been replicated in subsequent studies, including Miller and Dyer's 1975 study, in which they studied changes on several measures of general verbal intelligence after one year of Montessori preschool. Stanford-Binet scores averaged across the whole group rose from two to ten points, with an average gain larger than that of the control group. These findings suggest that Montessori preschool, over a period of approximately one year, has positive short-term effects upon general intelligence, as measured by tests that are heavily based on verbal performance, such as the Stanford-Binet (Chattin-McNichols, 1992).

Studies of perceptual, motor, and performance IQ development have shown similar results in favor of a Montessori education. Pendergast (1969) administered the Frostig Developmental Test of Visual Perception twice, seven months apart, to children in a Montessori nursery school, in a conventional nursery school, and to children with no

preschool experience. The study was done in order to evaluate hand-eye coordination and visual perception skills. Pendergast found that the Montessori children showed significantly greater gains in hand-eye coordination than those in the other two groups. In perception and position in space skills, there were nonsignificant gains in favor of the Montessori children. The same year, Banta of the Sands School Project tested children with preschool and primary Montessori school experience against control groups with and without a non-Montessori preschool background. The Montessori/Montessori group, Montessori/open classroom group, control with preschool group, and the no-preschool group finished in this order on all tests (Banta, 1969). This evidence suggests that the Montessori method is effective in nurturing development in the areas of perceptual, motor, and performance IQ development.

Many studies have been conducted in the area of Montessori education pertaining to academic achievement and school readiness. In Di Lorenzo's (1969) study it was found that children attending a highly structured, cognitively oriented prekindergarten programs – including one Montessori classroom – performed better on the Metropolitan Readiness Test at the end of kindergarten than children in traditional nursery school programs. The children in the cognitive programs also performed better on the same test at the end of first grade (Di Lorenzo, 1969). Many other, more recent studies have confirmed the effectiveness of Montessori programs in increasing academic achievement and school readiness, including Manner's (2000) study in which students from an elementary Montessori program were paired with age-mates from a traditional group on the basis of similar Stanford Achievement Test Scores in reading or math and retested over the span of three years. Mathematics scores for both groups were not observed to be

significantly different, although following the initial observation, the Montessori group continues to produce higher mean scores than did the traditional students. Reading scores for the groups demonstrated marginally significant differences by one analytical method, and significant differences when analyzed with a second method. In the second and third years of the study, Montessori students produced means which consistently outperformed the traditional group (Manner, 2000).

Studies on attention, concentration, resistance to distraction, and impulsiveness have also demonstrated the effectiveness of the Montessori method. Kohlberg (1968) has reported finding an increase in ratings of distractibility in the test situation in a permissive classroom, as compared to students receiving a Montessori school experience. Over the course of his study, Kohlberg found an IQ increase in the children receiving Montessori training, as well as an increased ability to attend and concentrate. Further positive results were found by Berger (1969), in a longitudinal assessment of 93 black and Puerto Rican three- and four-year olds enrolled in Head Start Montessori programs and conventional preschool programs. Berger found that motor impulse control scores from the Cincinnati Autonomy Test Battery consistently favored the Montessori children. These findings suggest that the Montessori preschool experience is effective in decreasing distractibility and impulsivity, and in increasing children's ability to concentrate and attend. This increase in attention and concentration may be a major factor accounting for the observed positive effects of Montessori preschool training on performance in intelligence tests of the Stanford-Binet type (Chattin-McNichols, 1992).

While studies have consistently shown the academic benefits of a Montessori education often demonstrated by achievement test scores, it is important to recognize that

these are not the only benefits a Montessori education is capable of providing. In a study comparing elementary children from traditional and Montessori programs, Castellanos (2003) investigated how these different educational philosophies and teaching methods affected perceived levels of self-esteem, self-efficacy, prosocial behavior, and aggressive behavior in children. While no significant differences were revealed in relation to the children's perceived levels of self-esteem, self-efficacy, or prosocial behavior, the Montessori children did report significantly lower levels of verbal and physical aggression than the traditional children. Furthermore, Montessori children's perceived ability to make and keep friends of the same gender was found to significantly improve with increased years in the program, which was not found in the traditional method. In addition, for Montessori children their perceived ability to work together in a group was found to be positively associated with heightened levels of self-efficacy for academic achievement and self-efficacy for self-regulated learning. Finally, the Montessori children's levels of self-esteem were correlated significantly with their perceived levels of self-efficacy for academic achievement and self-efficacy for self-regulated learning. While these qualities certainly have educational application, they also have the potential to have a greater and more important impact on the quality of the affected child's entire life.

The final category addressed in research on Montessori education is its lasting effects on children's lives once they leave the Montessori school system. In their study of the long-term effects of preschool experience on sixth and seventh grade students, Jones and Miller (1979) found the children from a Montessori educational background had higher SAT Total Reading and Total Math scores and WISC-R Verbal and

Performance IQ scores than children with Engelmann, DARCEE, or traditional educational backgrounds. On a larger scale, and premised on the view that students with more years of Montessori education would possess to a higher degree those qualities emphasized in the Montessori environment and that Montessori students would be as successful as students more traditionally educated, Glenn (2003) reported his final assessment on a study initiated in 1986. He concluded that a Montessori education was a key positive factor in the participants' academic, personal, and social development and is an important factor in their current identity. Montessori herself would be pleased with the results of this study, for although many studies have shown the ways in which Montessori education can lead to increased test scores, the underlying philosophy of Montessori goes beyond the realm of testing. One of Montessori's main goals in developing her method was preparing the child for success in all areas of life, not just in academics.

Though the process and outcome research that has been done on the Montessori method is wide-ranging and extensive, it cannot be considered to have received a complete evaluation by the research undertaken at this point. The current research is by no means all encompassing or perfect, and within it exist problems such as small sample size, short-term rather than longitudinal designs, confounding of teacher and method by using a single teacher to represent an entire model, and so on. The selection of inappropriate measures and instrumentation problems are also of concern, as is the confusion between the program and the model that often results from research on Montessori. In the words of Chattin-McNichols (1992), what research on Montessori needs is "a clear and objective way to assess whether a given classroom is within the

bounds of typical Montessori practices. At the very least, researchers must specify in more detail the teacher and environment of the classrooms they study” (p.205).

Montessori as an International Curriculum and its Implementation in the United States

As word of Maria Montessori’s success with the children at Casa dei Bambini spread and she began to gain fame, her inspiring educational ideas began to take root all over the world. Soon, Montessori schools had been established in many countries, and their numbers only grew with time. During the past forty years Montessori principles have been applied by persons of all kinds of religious beliefs – Catholics, Protestants, Hindus, Jews, Mahommedans, Buddhists, and atheists – and by persons of all kinds of political creeds (Standing, 1957). Today there are over 7,000 Montessori schools worldwide, and these schools exist on every continent except for Antarctica (Dasbach, 2003). The existence of these thousands of schools all over the world provides proof of the universality and staying power of the Montessori method, which is based on fundamental characteristics common to all types of humanity. Struck by the universality of its appeal, Dutch psychologist Professor Godefroy expressed the matter in the following terms: ““The Montessori doctrine has awakened in man sentiments which have always existed in a subconscious and latent manner in people’s hearts, awaiting only the necessary stimulus to become rapidly and vividly conscious”” (Standing, 1957, p.57).

The explosion of the Montessori method beyond its Italian origins and into the rest of the world in the early 1900’s did not go unnoticed in the United States. In fact, Montessori’s educational experiments became known to Americans almost as soon as they began. In 1906, when Montessori was organizing Casa dei Bambini, Dorothy Canfield Fisher, an author from Vermont who wintered in Rome, was writing home about

Montessori's educational practices, and advising Americans to pay attention to what Montessori was saying about the nature of young children (Chattin-McNichols, 1992). These writings and the attention they drew spurred S.S. McClure, editor of *McClure's Magazine* and a promoter, to join forces with Montessori and bring her over for an American tour. She arrived in 1911, and was welcomed by a small band of American teachers who she had trained earlier in Rome as well as by the family of Alexander Graham Bell, who had been working to organize the establishment of Montessori schools and a teacher training center in Washington D.C. (Loeffler, 1992). It was here that the first problems between Montessori and those attempting to spread her method emerged. Montessori was upset to hear that her schools were being constructed and her methods were being taught to teachers without her presence and consent. For a movement bearing her name to proceed in any country, she believed her presence was necessary. Despite these problems, Americans continued with the establishment of Montessori schools, teacher training and, in 1913, the Montessori Education Association. As the movement grew, American Montessori began to develop a certain character (Loeffler, 1992). However, without the direction of Montessori herself, the resulting schools, teachers, and associations were lacking in certain areas. Problems such as poor and uncomprehending reception by the educational leadership, adaptation of Montessori's methods in a variety of ways, a focus only on academics by demanding middle and upper class parents, and a flood of "trainers" and authors eager to capitalize on the Montessori name all contributed to the downfall of the Montessori movement in the U.S. By 1925, it was undeniable that the movement had failed (Loeffler, 1992).

Almost half a century and a World War later, the cultural and psychological climates of the U.S. had changed radically from those of Montessori's first visits. In the early 1960s, a group of parents who believed her ideas had particular relevance to their children's lives revived the movement, and this time it succeeded. But these Americans wanted more than just to adopt Montessori education from Europe. They believed American Montessori education needed to be as diverse and pluralistic as America itself. To accomplish this goal, the American Montessori Society was founded (Chattin-McNichols, 1992). The position of AMS was not that of a branch office of the European-based International Montessori Association. Rather, because of size of the country and complexity of the culture, it sought to represent a collection of ideas and possibilities for early education, all inspired by Montessori, but not all following an identical path. This collection of ideas and possibilities resulted in the many different forms of the Montessori school we see in the U.S. today – Montessori preschools, kindergartens, and day care programs as well as Montessori public, parochial, and independent elementary and secondary schools (Loeffler, 1992).

Montessori today and future implications

The existence of these varied styles of Montessori schools in today's world shows the ways in which Montessori has worked its way towards the developmental extremes of education. There has been implementation of Montessori theories as far down as prenatal education, and, conversely, up as high as adolescent education. In both cases, the emphasis remains on engaging the whole personality of the child and creating an educational environment that elicits the child's maximum potential (Loeffler, 1992).

Montessori is also expanding in terms of its applications. The ideas and principles of Montessori are affecting programs having to do with urban renewal, magnet public school education, intergenerational living, parent education, and so on. This is an exciting time for the Montessori movement, as the organization continues to try to accurately portray Dr. Montessori's original vision and at the same time expand what they can do to reach children more effectively. Montessorians are in a position to actualize Dr. Montessori's dream of providing an education that will meet the needs of every child (Chattin-McNichols, 1992). However, there are challenges they will inevitably face along the way. These include developing the unique potential of all the world's citizens for a world in which critical thinking, self-initiative and self-management, collaboration, ethical values, and global thinking will be valued, and to do all this in a variety of settings and with a population of all ages, infants through seniors (Loeffler, 1992).

Montessori's impact on child development

After researching her philosophy and the method that resulted from it, it can be seen that Montessori created a whole new movement of developmental psychology and that many of her innovations have now been accepted as standards for effective learning. These include recognition of the critical importance early childhood has for individual potential, furniture sized to the children who use it, and the idea of individualized instruction based on child needs (Loeffler, 1992). In addition, with all the talk about the importance of developmentally appropriate practices in education today, it takes only a short examination of Montessori's philosophy to realize that she practically *invented*

developmentally appropriate practices. Those who know the method well maintain that Montessori is a hallmark of excellence in education (Loeffler, 1992).

Montessori's legacy, however, is based on more than that. Her greatness lay in the fact that she saw in her system more than a set of materials interesting to the children, because she knew that these could and should be improved upon and replaced by others. She saw in it even more than an elaborate way of presentation of these materials to children, which explained mathematics by concrete manipulations and used inventive ways for teaching reading, writing and grammar. No, her greatness lay in her aim of transforming all the world's children, and through them the whole of humanity, by making them love their work. She said that, for human beings, work is a necessity, indispensable for remaining healthy. Work carried out in harmony with the laws of nature is not tiring. In fact, work is the purpose of life, and the greatest error in education is preventing children from working spontaneously (Wentworth, 1999).

While Montessori died in 1952, her method is alive and well, and has been carried on by her many supporters. Among these supporters was famed psychologist Jean Piaget, who after conducting his initial observations at a Montessori school and going through Montessori training went on to become President of the Swiss Montessori Society. Montessori's ideas were extremely influential to Piaget, and many of his widely accepted theories – such as his stages of cognitive development – were born from Montessori concepts. Through Piaget and her many other supporters, it can be seen that even after her death, Montessori's passionate spirit has survived.

It is clear that Montessori's ideas were truly ahead of her time, and this notion is made even clearer by the fact that she was able to identify the fundamental problem in

education as not an educational problem at all, but a social one. She believed that improvement in education needed to start with the establishment of a new and better relationship between the two great sections of society – children and adults (Standing, 1957). Her method, based around this belief, has been put into practice and has acted as a liberating force, setting free a new type of child.

In the words of Wentworth (1999), Montessori

“saw a need to find practical ways of eliminating the feelings of scorn, hatred, jealousy, inadequacy and rejection that are so characteristic, not only in much of our orthodox education but also, in consequence of that education, in our relations with each other in general in the adult world. She realized it meant encouraging children instead of condemning them, stimulating their good impulses instead of repressing the bad ones, seeing the spark of good intentions and endeavors under a mountain of wrongdoing, and believing in the ultimate triumph of good, creative aspirations over lawlessness, vandalism, and destruction. She believed, in short, that a good mental disposition is an indispensable requirement for a happy, healthy, and efficient life” (p.6).

It is this combination of practicality and passion for improving the lives of children that is Montessori’s lasting contribution to child development and to societies around the world.

Montessori was the perfect advocate of her cause, which was the cause of the child. In the whole history of education it has been given to few if any other educational reformers to have their work so fully and so widely appreciated during their lifetime and beyond as was the case with her. Gratifying as it must have been to have felt herself so widely appreciated, Montessori knew that what she had accomplished was only the first step. She knew she had discovered a key which could unlock immeasurable constructive energies for child and human development, and as yet only a fraction of these have become actual. Immense potential energies are still waiting to be set free (Standing, 1957).

