

Evaluation of Alternative Preschool Education Programs Regarding Their Perspectives on Teaching Science and Nature

Hasret Nuhoglu*

Maltepe University Teacher Education for Gifted Children Program, İstanbul, Turkey,

Article history

Received:
22.10.2013

Received in revised form:
19.11.2013

Accepted:
19.11.2013

Key words:

Montessori, Waldorf and
Reggio Emilia approaches,
science and nature teaching

Various preschool education programs are being implemented at the international level. These programs aim to raise self-confident, curious, creative, imaginative children, who respect themselves and others around them, can perceive problems and try to come up with alternative solutions to these problems. The purpose of this study is to make a comparative analysis of educational approaches of Montessori, Waldorf, and Reggio Emilia by reviewing their histories, philosophies, learning environments, teaching materials, roles of teachers and students in the learning process and by discussing science curricula, assessment processes and relationships between learners and teachers. Montessori approach is based on the theory that children can learn spontaneously in their own developmental process. It allows children to understand the order of the nature, to investigate, experiment, and make errors, and to correct their own mistakes. Waldorf approach aims to enable children learn about life and be an active member of society, by emphasizing the improvement of children's motivation and development of their cognitive and affective skills. Reggio Emilia approach allows children to make new discoveries through real life experiences. All three approaches are student centered and they allow children discover themselves and their environments. Evaluation of these programs regarding their perspectives on teaching science and nature, in theory and implementation, is also in the scope of this study.

Introduction

Contemporary educational approaches that have been proposed since 19th century are based on the following fundamental principles: children are fit and ready for improvement from birth; they are creatures on their own merit rather than miniature copies of grown-ups; their developments and societies should be respected; educational activities should be designed according to children's interests and needs; education must be the life itself, not a preparation for it (Chatelain, 1964).

Alternative educational approaches that are developed based on these principals propose a learner centered, freedom based point of view that emphasizes interaction with social environment, improvement of critical skills and psychological development. They also have a holistic understanding of development (Miller, 2004; Loftin, 2003). These alternative approaches differ from other educational approaches because they offer students and teachers choices, they are suitable for every student profile and they provide many alternative methods for learning.

* Correspondence: hasret.nuhoglu@gmail.com

While these alternative educational approaches essentially try to reach the same objectives, they differ in the processes of learning and teaching. One of these differences is to introduce children with nature and to explain what is happening around the environment through science topics, during their pre-school period, where the sense of curiosity and discovery are at their peak.

Nowadays, it is possible to come across many alternative educational approaches. In this study, three of these, namely Montessori, Waldorf and Reggio Emilia approaches are compared and contrasted to evaluate their perspectives of science and nature education. This evaluation has been done regarding their learning environments, use of educational materials, teacher-student relationships, science and nature curricula, and measurement and evaluation techniques.

Principles and historical development of Montessori, Waldorf and Reggio Emilia approaches

Non-violence, peace and reconstruction are the common outstanding ideals for these three approaches. Each approach share a solid vision that emphasizes use children's potential of intelligence and creativity in the best way possible, to ensure the development of a society (Edwards, 2002).

Historical developments of these three approaches also show similarities. Montessori and Reggio Emilia emerged from Italy, and Waldorf from Germany, before they expanded worldwide.

Dr. Maria Montessori (1870–1952), who was the first female medical doctor in Italy, opened her first “Children’s House” which was named after her, in Rome 1907. Montessori received a medical degree from University of Rome and then moved to the department of psychiatry in the same university for residency. During her time working in this department, she was interested in children with mental disabilities, and came to the conclusion that with a special education, their development can be improved. With this in mind, she examined Itard’s and Seguin’s work, who are the pioneers in the field of special education. After obtaining positive results working with mentally disabled children, she started working in the field of education, thinking the same approach would be successful with normal children. In order to gain more knowledge in this field, she studied philosophy, psychology and anthropology in the University of Rome (Montessori, 1997; Lillard, 2005).

Inspired by the work of philosophers and educators such as J. J. Rousseau, Henrich Pestalozzi, Friedrich Froebel, Edward Seguin and Jean Itard, Montessori has created a unique approach in early childhood education. She was especially influenced by the studies of Jean-Marc-Gaspard Itard and Edward Séguin (Shipley & Oborn, 1996; Edward, 2002, Korkmaz, 2005).

Fundamental principle of the Montessori philosophy is the idea that children carry the person they are meant to become within themselves. Children need freedom to achieve their full physical, intellectual and emotional potential. However, this freedom should be reached through order and self-discipline (Montessori, 1997).

Waldorf educational approach, based on the philosophical foundations of Rudolf Steiner, was developed under the leadership of Emil Molt, who was the owner of Waldorf Astoria Cigarette Factory in Stuttgart, Germany. Rudolf Steiner (1861-1925) was a scientist and a mathematician. He said that we can explain what we cannot see in geometry and mathematics

with the help of formulas; therefore he valued spiritual, immaterial aspects very much. Under the guidance of his technical, philosophical and mystical knowledge, he developed a thought and belief system called Antrosophy (human wisdom). This philosophy was against Western way of thinking which focused on the mind and ignored a person's emotions and willpower.

Following this thought system, with an educational approach that would develop awareness and liberate individuals' egos, Steiner and his friend Emil Molt opened the first Waldorf School in September 7, 1919 (Barnes, 1980; Uhmacher, 1995).

Steiner, the founder of Waldorf approach, is said to be influenced by Gothe's work on science. Main goal of Waldorf education is to help students develop an understanding of manners and their place in the world. According to this educational system, every individual is a global citizen. Hence, Waldorf approach aims to educate children in all aspects and adopts the philosophy of "heart, mind and skill" (Driscoll, 1999).

Waldorf education aims to enable children build upon their existing abilities instead of teaching children an intellectual content that they are not interested in. This way learning becomes an enjoyable journey of discovering oneself and the world. According to Waldorf approach, children become more alert and interested when they can make a connection between learning and their own experience, and they begin to learn through these experiences (McDermott, 1992).

In the spring of 1945 right after the Second World War, inhabitants of a small village called Villa Cella, 50 km northwest of Reggio Emilia in Italy, began to build a school for their little children. Loris Malaguzzi (1920-1994), a young teacher in his twenties, joined them to help.

Malaguzzi had resigned from his job as a protest against state policies that ignore the diversity among children and went to Rome to study psychology. After returning from Rome, he started working on small schools that the families had built (Edwards, Gandini & Forman 1998). The village preschool had been built by the families in 1946. Under the leadership of Malaguzzi this movement reached the city Reggio Emilia and eventually in 1968 Italian government decided to support preschool education.

Loris Malaguzzi, Founder of Reggio Emilia approach apparently had been influenced by the works of Dewey, Piaget, Vygotsky and Bruner, since he emphasized social constructivism. However, he found Piaget's cognitive developmental stages too structured; according to him the child is an intelligent and curious individual who has been social since birth. In Malaguzzi's view, the goal of education is to focus on supporting children's relationships with their families, peers and other people close to them. Consequently, children can change the system when they eventually become a contributor to the development of the culture they live in (Edwards, 2002).

Analysis of the Three Educational Approaches in Terms of Science Teaching

Learning Environments

In Montessori approach, child is in the center. The learning environment focuses on individual development and process, and is designed according to the needs and abilities of the child. In this environment every child is considered as a universe, and they are allowed to develop in their own pace (The Montessori Foundation).

Games that support creativity and imagination take precedence in Waldorf education. First thing that catches the eye in a Waldorf school is that the environment is cozy, natural and colorful, and contains a big play area. When children enter the classroom, they feel as if they are inside a fairytale. Children create their own play area; chairs and cloths, trains and ships made of wood pieces and pegs. The learning environment is designed in such a way that the children's senses are developed systematically and esthetically (Schmitt-Stegmann, 1997).

Learning environment in Reggio Emilia approach consists of the physical and social environment as a whole. These environments are designed to facilitate the social interaction between children and adults. Moreover, classrooms are arranged in a way that supports children's creativity and imagination and they can share ideas with each other. Environment allows children's interaction, but there are also areas where children can be on their own if they want. In each Reggio Emilia school there are various plants and flowers, a pantry and a kitchen, lunchroom, toilets and a garden. These schools have an atmosphere that pulls people in and make them want to play games (Edwards, Gandini & Forman, 1998; Amus, 2006).

Classroom Design

Montessori classrooms contain furniture that is light, mobile and suitable for children's body size. Cabinets and shelves can be easily reached by children, drawers and doors are easy to open. There are also coat hangers, brooms with short, straight handles and brushes. Children can reach and use educational and other sort of materials according to their interests and needs, independent of adults. No unnecessarily distractive elements can be seen such as huge chalkboards and notice boards, dozens of the same paintwork or big alphabets that cover the walls (Montessori Connections, 2012). Montessori acknowledges that the real beauty of simplicity. Therefore, for children too fancy, complex objects, rather than simple, arranged according to the needs of the child in a manner consistent an environment with bright colours available. Prepared in accordance with the size and needs of the child in this environment, there is no any object placed exclusively for adults (Pines, 1969, Evans, 1971; Lillard, 1973). Montessori class, child, adult, away from the pressures of management and their world can discover, develop intelligence and the body of an attractive environment (Mallory, 1989).

According to Steiner, in Waldorf approach children are assumed to be very sensitive to their environments and collect information using all of their sense organs. Therefore colors of the walls, furniture and materials are very important. Colors that are light and not eye tiring are preferred. Furniture is made from natural and enduring materials. In order to support children's learning, classes are filled with rich stimuli. Waldorf classes are considered as an extension of home environment and disturbing external factors are removed as much as possible. For example, teacher irons napkins and cloths in the class. Every child has a distinct symbol, which is used in everything that belongs to the child. The ceiling is low and descends towards the windows. There are no defined edges. Classrooms are decorated in light tones of pink and make children feel secure. Children leave their coats and shoes in cupboards with their name on them (SWSF, 2008).

In Reggio Emilia programs, a free environment is developed where children can discover properties of materials, shapes and colors. School interiors are warm and calm, matte colored, decorated with glass and wood. Boards in the classes are used as a tool for communication among children and to display their work (Hertzog, 2001). Sinks in bathrooms are designed to allow children reach the taps easily and be close to each other when they are washing their hands or playing with water. Floors are wooden but there are places covered with carpets. Different types of mirrors are placed on the floors and ceilings. Convex and concave mirrors

and mirrors formed as a triangular roof in the entrance, allow children think and observe themselves from various angles and in different situations (New, 1993; Amus, 2006).

Alternative Learning Environments

In Montessori schools there are spaces for working on the floor or sitting, individual and small group studies and class meetings. There are storage spaces for library collections and materials that are not frequently used (Montessori, 1997).

In Waldorf schools provided to children a simple learning environment like a home. It contain open-ended toys and activities to allow improve their creativity and imagination in the Waldorf early childhood education. The curriculum in a Waldorf school is not purely academic in nature, but includes art, practical activities, and physical education as well (Melissa, 2011).

For the purpose of facilitating social interactions between children and adults, large gathering areas (Piazza) are located in Reggio Emilia schools where children and teachers can spend some time together. Classrooms are located around this area. Children and adults have to pass this area during the day (Aral, Kandır & Yaşar, 2000). Piazza is not a place where children simply discharge, but a place for discovery, dramatization, and costume plays. The boards placed inside “Piazza”s inform parents about current projects, journals and children’s dialogues amongst themselves. Children’s products are also displayed here (Amus, 2006).

Reggio Emilia schools also contain “ateliers”, workshops that are a cross between studio and laboratory, full of natural materials and art supplies. Each atelier has a graphical arts expert called “atelierista”, who works with the teacher and the children. Activities held in here enable students express themselves via new tools such as clay, painting, sculpture and collages. Education environments in Reggio Emilia schools have attractive, comfortable book corners and areas full of various toys and dolls for playing house.

Playgrounds (gardens and play areas)

Ideally, Montessori educational environment includes a little greenhouse, garden, a workshop for carpentry, an observation room with a one-way mirror and a small office (Montessori, 1997).

In Waldorf environments, there are safe outdoor spaces containing sand boxes and mud ponds, trees, shrubs and short walking tracks. Also available are organic fruit gardens where children can pick up fruits. They walk on balance boards, climb trees, jump over ropes and dig the ground. This way, children discover their boundaries, recognize their potential and try to improve it (SWSF, 2008).

Reggio Emilia schools have outdoor areas for water plays, hills for climbing, various little trees planted by the parents and picnic tables (Bennett, 2001).

Materials Used

Educational Materials

In Montessori learning environments, materials are designed (from simple to complex, abstract to concrete and specific to general) to allow children desire tackling more complex tasks as they succeed simpler ones. They use natural and real materials that adults use in daily life; they drink tea in glass cups, do ironing with real iron and cut vegetables with real knives (Montessori, 1997; Temel & Dere, 1999). There are only one set of each material in the

Montessori class. These materials can be categorized into six basic themes: daily life, senses, language, mathematics, biology and geography. Most important properties of these materials are that they are durable and they have unique purpose.

Multi-purpose toys in Waldorf classes foster children's imaginations. Toys are made of natural materials to allow maximum scope for imaginative use as props in children's play. Through plays, they can assume different roles, make social contacts and have the opportunity to use what they learn. Wooden blocks (natural timbers with no geometric shapes), natural cloths, Waldorf dolls, porcelain, ceramic plates and fresh fruit baskets can be seen in the Waldorf classes. Additionally, there are mills, fruit presses, repair kits, simple hand tools (these are generally stored in sheds and used for garden work), watercolor paints, wide brushes, pastels and crayons, sewing kits and custom designed picture books. Children work with crayons on a daily basis, but use brushes only in watercolor painting activities (SWSF, 2008; Toprak Ana, 2009; Şenol, 2012).

Reggio Emilia toys are usually made of wood and recyclable (Bennett, 2001; Amus, 2006). Telephone with flexible line, various ropes and rocks are also available so that children can make some discoveries.

Science Materials

There is a nature table in the Montessori classroom. Flowers and plant seeds are always available and you can also see animals such as rabbits, snails, silkworms and ants in the class. A space is reserved in parks or gardens for raising animals or planting (Gilder, 2009; Poyraz & Dere, 2003). Botanical cards, zoology sets, equipment for chemistry and geology are among science materials used (Montessori Materials, 2012; Montessori for Learning, 2012).

Waldorf classrooms contain natural materials such as calabashes, pine cones, branches and pebbles that are used in activities aiming to understand and become a part of nature (Şenol, 2012). Children are encouraged to look after the kindergarten equipment, sanding and oiling wooden furniture and toys, mending things that break, washing cloths and other simple tasks which children and adults can do together (SWSF, 2008).

Teachers support all kinds of child development in Reggio Emilia approach. Taking children's interests and needs into account, they try to construct their scientific knowledge through various activities. In Reggio Emilia classes, education is combined with art. Children's observations are integrated with paintings. For example, children are initially asked to draw poppies, then they go to the fields to observe and draw real poppies. Then two pictures are compared. This process helps children compare their imagination and observations (Gandini, 1993).

Teacher-learner relationship

Teacher's role

In Montessori education, teacher is a guide supporting the children's participation and assists them whenever they need help. Teachers are capable of their duties and responsible for designing the environment making children interact with that environment. They allow children use their potential to improve themselves. In addition, teachers are excellent observers; they monitor each child's development, and know what kind of materials the child should use for which purpose. When a child makes a mistake, following the principle "children learn through experience", teacher does not intervene directly, but helps the child

realize the mistake (Mallory, 1989; Poyraz & Dere, 2003; Malm, 2004; Temel, 1994; Korkmaz, 2005; Oğuz & Akyol, 2006).

Waldorf teachers have dedicated themselves to “bring out the love of learning that exists inside every child”. They use arts and activities freely during the process of teaching. Teachers are required to have a university degree and a certificate from Waldorf School Teacher Collage (Reinhard, 1997; SWSF, 2008). In Waldorf schools the class represents family environment where the teacher acts as the authority figure. The teacher’s main responsibility is to accept the child born in this world with gratitude, teach children with affection, and lead them while allowing them the full freedom any human being deserves. Fundamental academic subjects are thought by the same teacher throughout the school years (Waldorf Answers, 2004). In Waldorf schools, teachers emphasize children’s strengths, not their weaknesses (McDermott, 1992).

Reggio Emilia approach, teachers are considered to be learners. Teachers are obligated to provide opportunity and suitable environment for children so that they can move with enough freedom and construct knowledge. They see themselves as “compasses” in the journey of discovery they take on with children (Cadwell, 1997; Temel & Dere, 1999). In addition, they support children to strengthen the social construct of the classroom and help them plan their learning experiences. A classroom does not belong to a single teacher, whole educational staff plan and work together. School cook and other staff attend meetings of weekly planning; there is no hierarchy of duty, so that everybody is included in planning and making other arrangements for children (Bennett, 2001).

Reggio Emilia teachers also act as researchers. They work in strong cooperation with their colleagues and other staff; discuss and make comments on their daily work and children’s progress among themselves. These comments provide sustainability of education and enhance it theoretically. Teachers see themselves as researchers who document their work with children. Rather than providing solutions to problems themselves, teachers help children come up with their own solutions (Gandini, 1993).

Learner’s role

As a modern educational approach, Montessori allows children to investigate, make trials and errors, and correct their mistakes on their own (Vilscek, 1966). According to this approach, understanding the rules of nature is the basis of science. Children should notice and appreciate the order, harmony and beauty of nature. Individuality of the child is forefront in Montessori education (Montessori, 1997; Korkmaz, 2006; Gilder, 2009)

Waldorf educated children are no longer dependent on outer objects for creative, symbolic activity but can develop an independent internal imaging ability (Schmitt-Stegmann, 1997).

Reggio Emilia approach suggests that the child is against a wall that blocks his/her development while growing up. The child should succeed in passing through this wall on his/her own. Basic characteristic of Reggio Emilia approach is that it is constructed according to the rights children have, rather than their simple needs. Malaguzzi (1994) states that if children have their legal rights, they will also have the opportunity to improve their own intelligence. This way, children’s competent, creative and curious requests and attributes with high potential can be recognized.

Children that own their rights will take active role in learning and be more eager to perceive the world they possess since birth, learn and discover. Reggio Emilia approaches do not

consider the child as an objective of education; children have active roles as an apprentice. As they are discovering, they work with other to find solutions to problems (Katz, 1993).

Curriculum

Montessori observed that, when children go through their natural development process in a suitable environment, they learn science, mathematics and how to read and write on their own just like they learn speaking and walking. In Montessori curriculum teachers develop a classroom design that is compatible with Montessori "prepared environment" principles. They create uninterrupted daily work periods of 90 minutes to 3-hours, considering the 3-hour work cycle as ideal, integrate specialty programs (music, art, physical education, etc.) around the uninterrupted work periods.

In Waldorf approach, children learn various elements in nature. When working with soil, they learn how its composition changes through seasons; they discover creatures living in the soil by farming or planting a flower. In addition, children know the gardeners working in the garden. Together, they cook meals in wood fire. They learn math and statistics while playing with sand, stones and wood. They also learn uses and changes of state of water, how rain is formed and similar events in nature by experience and active involvement. Science is thought through stories, poems and theatrical activities (Barnes, 1991; Schmitt-Stegman, 1997).

In Waldorf early childhood schools, children are encouraged to appreciate the natural world. The beauty of nature, plants, insects and animals is brought to the children with awe and wonder. Domestic tasks provide opportunities for elementary experiences of science and the four elements. When children make toys from sheep's wool, wood, felt, cotton and other natural materials they learn about its origin (SWSF, 2008).

Children in Reggio Emilia schools are allowed to make new discoveries through real life experiences. They follow the process of research, production and hypothesis testing (Temel & Dere, 1999). They strive to discover nature, make observations and develop projects based on these observations. Children are expected to develop basic scientific process skills such as making observations and comparisons, analyzing and evaluating results obtained from these observations (Cadwell, 1997). This approach presents many opportunities that involve problem solving, creative thinking and research (New, 1993).

Science experiments cannot be repeated or copied without any change in Reggio Emilia approach, because it has a philosophy that inspires teachers. Teachers can make adjustments or adopt parts that are relevant to the subject matter. Curriculum developed by teachers emphasizes research, meaningful understanding, arousing curiosity and group work, and provides children project based science experiences (İnan, 2009).

Assessment

In Montessori education teacher use a process of reporting student progress that is compatible with Montessori and includes parent conferences and authentic assessment tools such as observation, portfolio, performance assessment with rubric. They implement state mandated assessments in such a way that the character of the Montessori program is not compromised (Montessori, 1997).

The Waldorf method of evaluation might be characterized as the "Look At The Leaves" approach. To facilitate this indirect and qualitative assessment method, several important elements must come into play: the class teacher, parent, community of evaluators, portfolio

approach and conservation. The class teacher comes to know the children, their “learning styles” and their developmental needs in a comprehensive manner. The Waldorf parent is asked to be an active part of the assessment process. In making her evaluation of the child, the Class Teacher has to work with a group of special-subject teachers who can speak of the child’s progress and so contribute to the total picture of the child. Students are assessed by portfolio approach that includes the child’s drawings, paintings, knitting, facility of movement, musical skills, oral expressiveness etc. as factors that are no less important than the more easily determined powers of cognition and verbal memory. The Waldorf assessment method is time and labor intensive in nature. It cannot function without numerous meetings and conversations between teacher and teacher, and teacher and parent. (McDermott, 1992; Eugene, 2009)

In Reggio Emilia approach, documentation system is used for assessment. Teachers observe children in each working process, and try to understand their inner worlds by keeping written and visual records of these observations. This documentation aims to understand and analyze children’s thinking and learning processes (Edwards, 2002; İnan, 2009)

Discussion and Conclusion

It is found two articles in the literature about compared these approaches. Cox & Rowlands (2000), compare Steiner, Montessori, and traditional methods of education in order to determine which approach is best for children’s drawing ability. The results indicated that the Steiner method was the most conducive to creative, general drawing, and colour detail. Steiner also produced better overall results in accuracy and detail of observational illustrations. Edwards (2002), compares and contrasts the Waldorf, Montessori, and Reggio Emilia approaches to education. These progressive approaches emphasize the importance of respect, peace, and reconstruction in the development of individualistic and intelligent children. Of these approaches, Montessori education has the most empirical research on learning outcomes. This article tries to make a comparative analysis of educational approaches of Montessori, Waldorf, and Reggio Emilia by regarding their perspectives on teaching science curricula.

When these three European originated educational approaches are compared with respect to their foundations and philosophical roots, some similarities and differences are stand out. Looking at the founders’ background, it is seen that Montessori was a psychiatrist, Waldorf’s founder Steiner was a scientist and a mathematician, and Reggio Emilia’s founder Malaguzzi was a teacher and a psychologist. Fundamental characteristic of all these founders is that they are innovative, open to challenges, resourceful and able to find alternative solutions to problems. All three approaches have risen as a part of an effort to revitalize a society that had been going through tough times. Although Montessori and Waldorf approaches were created and developed by the founders, Reggio Emilia differs from them in one point: it is a movement that women started for their children with the involvement of society.

Focus point of all the approaches is the children. Considering the difficulties and lack of resources that people were facing during the years these approaches emerged, it seen that the intention is to form a profile of a child who could manage to satisfy his/her own needs, take on responsibilities, be aware of his/her talents and be able to use these talents effectively. Montessori approach focuses on the physical, intellectual and emotional potential of children while Waldorf approach focuses on their heart, mind and talents. In Reggio Emilia approach on the other hand, the focus is on children’s social lives, curiosity and desire to explore.

In terms of learning environments, one common aspect of all the approaches is that they are designed to allow children act independently and freely. Classes contain simple, wooden furniture that does not limit children's movements. However, there are some differences in the arrangement of learning environments. One of the biggest differences is use of boards in classroom. In Montessori approach, there are no boards or other distracting materials on the walls, whereas in Waldorf approach, walls are full of various stimuli to enhance children's learning. The walls of Reggio Emilia classes are decorated with children's work and they facilitate communication between children and parents. One distinct feature in Montessori class is the elliptic line on the floor, which is used in walking exercises. An aspect of Reggio Emilia that is not found in other approaches is the triangular roof made of mirrors in the entrance of the school. These mirrors allow children look at themselves form different angles. Reggio Emilia schools also have large windows and classes receive plenty of sunlight. On the contrary, following antroposopic architecture, curtains in Waldorf schools are sometimes kept closed, for example in mealtime, because eating is considered as a ritual.

When teaching materials are considered, the most remarkable point is that Montessori materials are too structured. Materials focus on a unique purpose, they are always put in the same place in the class and there is only one set of each material. After children are done with the materials, they put the materials back in their places. Meanwhile, materials of Waldorf and Reggio Emilia approaches are modifiable and can be used for different purposes. Montessori focuses on reality, while other approaches emphasize creativity and imagination.

Teacher plays an important role in all approaches. Montessori teachers act as guides who observe and support children's development, and help them when needed while in Waldorf approach that provides family environment in their classes, teachers represent the authority figure in the family. When learning processes are compared, it is seen that Waldorf teachers initiate the work and children join them gradually. Children work with the same teacher through most of their education whereas in Reggio Emilia approach teachers are considered as productive learners who constantly improve themselves and take part in the learning process along with the children. There is not only one teacher in the class; since sharing and communication are essential, people such as pedagogues, atelieristas, cooks, assisting staff and parents work together in harmony. It can be concluded that, in this age of science and technology, Reggio Emilia teachers take more active roles in preparing children for the future.

In all three approaches, children are assessed without traditional tests and grades. In assessment process teachers and parents work in partnership. Parents receive extensive descriptive information about their children's daily life and progress and share in culminating productions or performances. Especially portfolios or other alternative evaluation methods products of children's individual and group work may be displayed and sent home at key intervals and transitions (Edwards, 2002).

In the area that the Reggio Emilia school is built, the society and its culture are incorporated in education. Pedagogues and artists support children in the ateliers. In addition, there is a recycling center nearby each school and children use materials coming from these center.

In Montessori education of the five senses is given with the help of teaching materials, Waldorf education addresses 12 senses, including intuitions, with the help of natural materials and children's imaginations. Since Reggio Emilia approach assumes every child is a unique social individual with a different point of view, education is customized according to the child's development, interests and desires.

Repetition plays an important role in Montessori approach. Together with repetition, Waldorf approach also values rhythm (Ogletree, 1997) since they both help children develop feelings of trust. The child needs to know what to do in every hour of the day, therefore breakfast time, garden time etc. never change. They stick to strict schedule, thinking that radical changes in children's lives lead to confusion. In addition, Waldorf schools have a weekly rhythm; for instance Mondays they play house, Tuesdays they do water color painting, Wednesdays they bake breads. Same tale is told throughout the week. Annual rhythm involves a theme set for a year, and throughout the year subjects of the theme are thought through experiences. Montessori approach focuses on child's individual work, and this leads to one of the most criticized aspects of Montessori education; the danger of children's isolation from their environment due to extreme individualism (Buğday, 2002). Similar to Waldorf education, everything in the Montessori program is predetermined and assessment of this program depends on the child's improvement. Reggio Emilia's program is more flexible and easier to change compared to the other two approaches, since they do not have a predetermined class schedule; when children start school, studies and activities are arranged according to general and specific objectives relevant to each child.

All approaches agree that children are inclined to learn the nature of science in early ages through experience and active involvement. In Montessori approach, children learn science related subjects by doing activities in the garden and plant house, and using science materials. Since Waldorf schools do not present any academic content for early childhood, they learn science subjects in a natural environment by discovery and experience. Reggio Emilia school supports science learning by channeling children to projects that foster research and discovery. Plans are made considering children individually. Generally, there is a planned schedule; it can be adjusted according to the children's wishes and interests.

The Table 1 below compares the three approaches with respect to various criteria.

Table 1: Montessori, Waldorf and Reggio Emilia approaches compared

	Montessori	Waldorf	Reggio Emilia
Country of Origin	Italy	Germany	Italy
Founders	Maria Montessori	Rudolf Steiner	Loris Malaguzzi
First Schools and Opening Dates	House of Children- 1907	Waldorf School-1919	Village School-1946
Scholars of Influence	J.J. Rousseau, Pestalozzi, Frobel, Seguin, Itard	J.J. Rousseau, Goethe	Dewey, Piaget, Vygotsky, Bruner
Premise	Freedom through order and self discipline Realism is emphasized	Heart-Mind-Talent Imagination and creativity are emphasized	Social development and constructivism Imagination and creativity are emphasized
Development Fields Supported	Supports cognitive development	Supports affective development	Supports social development
Child Image	Individual, free, self disciplined child	Child developing talents with heart and mind	Social, intelligent, curious child
Teacher's Role	Guide	Family Authority	Learner
Interactions	Child-Teacher	Child-Teacher	Child-family-teacher-society-environment
Materials	Simple, durable, natural, wooden Constructed	Simple, durable, natural, wooden Predisposed to learning	Simple, durable, natural, wooden Predisposed to learning
Learning environment	Focused on individual development and process	Focused on development of senses in an esthetic and orderly fashion	Focused on social interaction between adults and children
Physical environment	Closed to stimuli Furniture is easily reachable	Rich stimulus Furniture is easily reachable	Rich stimulus Furniture is easily reachable

Acknowledgement

Some parts of this article presented in 3rd International Conference on New Trends in Education and Their Implications.

References

- Amus, G. (2006). Dayanışma, İletişim, Paylaşım Ve Çocuğa Verilen Değer: Reggio Emilia Yaklaşımı. [Solidarity, Communication, Sharing, and the Child Given Value: Reggio Emilia Approach] *Zil ve Teneffüs Dergisi*, 6: 48-54.
- Aral, N., Kandır, A. & Yaşar, M. (2000). Okul Öncesi Eğitim ve Ana Sınıfı Programları [Programs in Early Childhood Education and Kindergarten]. Ya-Pa Publication, İstanbul.
- Barnes, H. (1980). An Introduction to Waldorf Education. *Teachers College Record*, 81, 323-336.
- Barnes, H. (1991). Learning that grows with the learner: An introduction to Waldorf Education. *Educational Leadership*, 49, 52-54.
- Bennet, T. (2001). Reactions to Visiting the Infant-Toddler and Preschool Centers in Reggio Emilia, Italy. *Early Research and Practice*. Volume 3, number 1.
- Buğday, (2002). Eğitimde Alternatif Uygulamalar.[Alternative Education Applications] ISSN: 1302-5554, IFOAM, EVU and GEN Publication: 1, 14, İstanbul.
- Cadwell, L.B. (1997). Bringing Reggio Emilia Home. An Innovative Approach to Early Childhood Education. P:2-5. Teacher Collage Press. Columbia University, U.S.A.
- Chatelain, F. (1964). Yeni Eğitimin Prensipleri. [New Principles of Education] (Translation: Nuri Kodamanoğlu), Millî Eğitim Basımevi, Ankara.
- Cox, M. V. & Rowlands, A. (2000). The Effects Of Three Different Educational Approaches on Children's Drawing Ability: Steiner, Montessori, and Traditional. *The British Journal of Educational Psychology*, 70(4), 485-503.
- Driscoll, A. & Nagel, N.G. (1999). *Childhood Education, Birth-8*. Allyn and Bacon, Boston: USA.
- Edwards, C. P. (2002). Three Approaches from Europe: Waldorf, Montessori, and Reggio Emilia. *Early Childhood Research and Practice*: 4(1): 1-14.
<http://ecrp.uiuc.edu/v4n1/edwards.html>.
- Edwards, C., Gandini, L. & Forman, G. (1998). *The Hundred Languages of Children*. Ablex Publishing Corporation. London.
- Eugene S. (2009). Discover Waldorf Education: Assessing Without Testing. millennialchild.wordpress.com/article/discover-waldorf-education-assessing-10mw7eus832b-4/ 2/10.
- Evans, D.E. (1971). *Contemporary Influences in Early Childhood Education*. Holt, Rinehart and Winston Inc. s.59, New York.
- Gandini, L. (1993). Fundamentals of the Reggio Emilia Approach to Early Childhood Education. *Young Children*, 49 (1), 4-8.
- Gilder, S. A. (2009). Montessori by Nature. *Montessori Life*, 4: 34-37.

- Hertzong, N. B. (2001). Reflection and Impression from Reggio Emilia: "It's Not About Art!" *Early Childhood Research and Practice*. Volume 3, number 1.
- İnan, H. Z. (2009). Science Education in Preschool: How to Assimilate the Reggio Emilia Pedagogy in a Turkish Preschool. *Asia-Pacific Forum on Science Learning and Teaching*, 10 (2): 1.
- Katz, L. (1993). What can we learn from Reggio Emilia? In C. Edwards, L. Gandini, & G. Forman (Eds.). *The hundred languages of children: The Reggio Emilia Approach to Early Childhood Education*. 19-37. Norwood, Nj: Ablex.
- Korkmaz, E. (2005). Montessori Metodu ve Montessori Okulları: Türkiye`de Montessori Okullarının Yönetim ve Finansman Bakımından İncelenmesi. [Montessori Schools and Montessori Method: Investigation of The Montessori Schools in Turkey in Terms of Management and Finance]. Unpublished Master's Dissertation. Marmara University, Institute of Education Science, İstanbul.
- Korkmaz, E. (2006). Montessori Metodu / Eğitimde Bir Alternatif. [Montessori Method /Alternative Education]. Algı Publication, Ankara.
- Lillard, A.S (2005). *Montessori, The Science Behind the Genius*. Oxford University Press, New York.
- Lillard, P.P. (1973). *Montessori, A Modern Approach*. Schocken Books, New York.
- Loftin, J. (2003). Making a Difference: Alternative Education in Indiana. The Indiana Alternative Education Conference, Indianapolis, http://www.learningalternatives.net/Loflin_alternatives_paper.doc
- Malm, B. (2004). Constructing Professional Identities: Montessori Teachers' Voices and Visions. *Scandinavian Journal of Educational Research*, 48(4), 397-412.
- Mallory, T. (1989). *Montessori ve Çocuğunuz, Ana-Babanın El Kitabı*. [Montessori and Your Children, Parental Handbook]. (Translation: Füsün Öztaş ve Cihan Gülten). Hatipoğlu Publication, Ankara.
- Malaguzzi, L. (1994). Your image of the child: where teaching begins. *Child Care Information Exchange*, 3, 52-61.
- McDermott, R. (1992). Waldorf Education in America: A Promise And Its Problems. *Questia Journal Vol. 15 (2): 82*.
- Melissa, K. (2011). Approaches to Natural Learning: Montessori, Reggio Emilia, and Waldorf. Natural Parents Network. <http://naturalparentsnetwork.com/approaches-to-natural-learning-montessori-reggio-emilia-and-waldorf/>
- Miller, R. (2004). Educational Alternatives: A Map of the Territory. *Paths of Learning Magazine*, 20, 20.
- Montessori, M. (1997). *Çocuk Eğitimi, Montessori Metodu* [Children's Education, Montessori Methods] (Translation: Güler Yücel). 5. Issue, Özgür Publication, İstanbul.
- Montessori Connections, (2012). "Early Childhood Classroom, 3 to 6 Years", www.montessoriconnections.com/about_montessorieducation/montessori_ed013.html
- Montessori Materials, (2012). Pre-school Montessori Materials. <http://www.montessorimaterials.org/science.htm>

- Montessori for Learning, (2012). Science Montessori Units.
<http://montessoriforlearning.com/ScienceIndex.html>
- New, R. S. (1993). "Reggio Emilia: Some Lessons For U.S. Educator". Eric Clearing-House On Elementary and Early Childhood Education U.S.A. ERIC, ED 354988.
- Ogletree, E. J. (1997). Eurythmy in Waldorf Schools. ERIC ED 410 023.
- Oğuz, V. ve Akyol, K. A. (2006). Çocuk Eğitiminde Montessori Yaklaşımı. [Montessori approach in Childhood Education]. Çukurova University, Journal of Social Science Institute, 15(1): 243–256.
- Pines, M. (1969). Revolution Learning. Allen Lane, The Penguin Press, London.
- Poyraz, H. & Dere, H. (2003). Okulöncesi Eğitiminin İlke ve Yöntemleri. [Principles and Methods of Early Childhood Education]. 2. issue, Anı Publication, Ankara.
- Reinhard, B. (1997). Public Waldorf School In Calif. Under Attact. Educational Week. 16 (39): 1-3.
- Schmitt-Stegmann, A. (1997). Child Development and Curriculum in Waldorf Education. ERIC-ED 415 990.
- ShIPLEY, G. L. & OBORN, C. S. (1996). A Review of Four Preschool Program: A Preschool Models That Works", Annual Meeting of the Mid-Western Educational Research Association, Chicago, ERIC ED401034.
- SWSF, (2008). Steiner Waldorf Early Childhood Education.
<http://www.steinerwaldorf.org.uk/earlyyears.html>
- Şenol, Ş. (2012). Waldorf Pedagogy.
http://geloyna.org/index.php?option=com_content&task=view&id=22&Itemid=30
- Temel, Z. F. & Dere, H. (1999). Okul Öncesi Eğitimde Yaklaşımlar. [Approaches to Early Childhood Education] Gazi University Preschool Teachers Handbook. Ya Pa Publication, İstanbul.
- Temel, Z. F. (1994). Montessori'nin Görüşleri ve Eğitime Yaklaşımı. [Montessori Perspective and Approach to Education]. Okul Öncesi Eğitimi Dergisi. 26 (47), 18-22.
- The Montessori Foundation. Twenty Best Practices of an Authentic Montessori School.
[http://www.montessori.org/?defaultarticle=&defaultnode=46&layout=29&pagefunction=Load%20Layout&formfields\[newnode\]=46](http://www.montessori.org/?defaultarticle=&defaultnode=46&layout=29&pagefunction=Load%20Layout&formfields[newnode]=46)
- Toprak Ana, (2009). Radyo Programı. Eğitimde Nereden Nereye? [Radio Program. From Where to Where in Education. <http://toprakana-radyo07blog.blogspot.com/>
- Uhmacher, B. P. (1995). Uncommon schooling: A historical look at Rudolf Steiner, Anthrosophy, and Waldorf Education. Curriculum Inquiry, 25, 381-406.
- Vilscek, E. (1966). Programs for the Pre-school Child. ERIC ED 012684.
- Waldorf Answers, (2004). www.waldorfanswers.org