T.C.
BAŞKENT ÜNİVERSİTESİ
INSTITUTE OF SOCIAL SCIENCES
INTERIOR ARCHITECTURE AND ENVIRONMENTAL DESIGN
MASTER PROGRAM

ANALYSIS OF INTERIOR DESIGN REQUIREMENTS FOR KINDERGARTEN CLASSROOMS WITH RESPECT TO LEARNING ENVIRONMENT ELEMENTS

MASTER'S DEGREE THESIS

SUBMITTED BY

ANA DEL PILAR ROBLEDO MENDEZ

THESIS SUPERVISOR

Asst. Prof. BETÜL BİLGE

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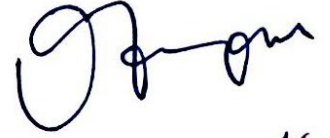Öğrenci Danışmanı Unvan, Ad, Soyad,

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ABSTRACT

Robledo Mendez, Ana del Pilar. *Analysis Of Interior Design Requirements For Kindergarten Classrooms With Respect To Learning Environment Elements, Master's Degree Thesis, Ankara, 2017.*

Preschool education is the most crucial stage of children's physical, social, cognitive and emotional development. Nowadays it is very common that both parents work, while their kids are cared by teachers, therefore an effective classroom design should provide the child with the right facilities for the efficient development of his/her personality since they spend much of their time in such settings. The present study gathers the overall information of elements within learning environments, children's needs and the response of surveyed teachers. Providing general considerations for an effective implementation of three alternative teaching methods within learning environments. The study analyzes the interaction of three teaching methods with the classroom design and it suggests what responsible educational institutions and especially designers can do at a general level to contribute to the improvement of early education. The study is designed using descriptive research method, scientific observation and to collect data 24 participants from Ankara (Turkey) were surveyed. Three different schools were analyzed by means of interior design criteria within learning environments to determine how classroom design supports the teaching-learning process and follows the principles of three teaching methods. Existing research and the data gathered were subsequently used to provide considerations for a proper design of a kindergarten classroom, supportive for the activities that both children and teachers perform on a daily basis, also within this framework the elements that contribute to children skills development as features of the learning environment were determined.

Keywords: Interior Design, Learning environment, Generation Alpha, STEM Education, Multiple Intelligence Theory, Montessori Method.

ÖZET

Robledo Mendez, Ana del Pilar. *Öğretici Çevre Değerlerine Göre Çocuk Yuvası Sınıflarının İç Mekan Tasarım Gereksinimleri, Yüksek Lisans Tezi, Ankara,2017.*

Okul öncesi eğitim çocukların bedensel, sosyal, bilişsel ve duygusal gelişimi için en önemli evredir. Günümüz şartları gereği ebeveynlerin çalışmasıyla birlikte, çocuklar erken yaştan itibaren yuvaya gitmekte ve öğretmenler tarafından eğitilip, bakılmaktadır. Çocukların zamanlarının büyük bir bölümünü geçirdikleri bu ortamlarda, kişiliklerinin verimli bir şekilde gelişmesi açısından, etkin bir sınıf tasarımının sağlanması gereği ortadadır. Bu güncel çalışma, günümüz öğrenme alanları içerisinde etkin olarak kullanılan üç öğretim yöntemini esas almaktadır. Çalışmada STEM Eğitimi, Çoklu Zeka Teorisi ve Montessori Metod'un birbiri ile etkileşimi analiz edilmiş ve ortak hedefler öğretici çevre değerleri açısından ele alınarak, sınıf iç mekan tasarım gereksinimlerine yanıt aranmıştır. Bu bağlamda, tanımlayıcı araştırma yöntemi, bilimsel gözlem ve anket üzerinden değerlendirmeye alınmıştır. Üç farklı method ile eğitim veren anaokullarının öğrenme ve öğretme süreci verileri alınmış ve sınıf iç mekanları incelenmiştir. Elde edilen veriler, eğitim modellerinin ortak hedefleri gözetilerek, öğretici çevre mekansal değerleri açısından ele alınmış ve sınıf iç mekanlarında alfa jenerasyonuna yönelik beceri ve gelişimlerini destekleyici iç mekan gereksinimleri değerlendirilmiştir.

Anahtar Kelimeler: İç Mekan Tasarımı, Öğretici Çevre, Alfa Jenerasyonu, STEM Eğitimi, Çoklu Zeka Teorisi, Montessori Metod.

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ABBREVIATIONS

MI:	Multiple Intelligence
STEM:	Science, Technology, Engineering and Mathematics
PBL:	Project Based Learning
NSW:	New South Wales
AIKA:	Asociación Internacional de Kinesiología Avanzada
	(International Association of Advanced Kinesiology)

CHAPTER I

INTRODUCTION

Currently child care services operate including a variety of factors, whether using new buildings, constructed buildings, renewed spaces or built on purpose. These factors, along with children's ages, type of service, community, physical environments, and so forth, involve challenges or opportunities for children (Stonehouse, A., 2011). It has always been said that children are the hope of tomorrow, however, our attention is still focused on their material and intellectual needs, which are not enough to educate them. Currently, we need more developed intelligence that achieve a global view for the solution of problems, we need open, flexible minds, able to relate the parts, see the totality and offer practical and creative solutions. Preschools have become an important part of a child's main learning experience, as well as the concept of environment as a third teacher in children's learning process, recognize that there are many factors that can improve or interfere with children's education (Stonehouse, A., 2011). Learning environments affect children's behavior, however, adults are prone to forget that the environments in which children live, grow, learn, and play leave a lasting impression. As interior design continues to press forward, it is becoming increasingly important to evaluate the ways in which we design for children. With design, the opportunity to not only shape and improve physical space but the ability to positively impact the lives of the people who inhabit the space is given. However, this gap between childhood and adulthood can be bridged to create nurturing spaces that are supportive of the activities that both young children and adults perform on a daily basis (Lynn West, T. 2011). Learning environments provide quality to education, form, help or interrupt the development and learning of children. The environment is constituted by physical, social, cultural, pedagogical, human, historical elements that are interrelated, supporting or limiting the interaction, communication, identity, sense of belonging and independence in children (Castro, M. & Morales, M., 2015). This reality is directly connected with the type of education needed to give to the future generation, through spaces that cultivate the intelligence of the future and cultivate the autonomy of the student. Jaramillo (2007) reinforces this idea when considering that the classroom is essential in favoring the physical, social and cognitive development of children and that in turn can favor the development of skills required in the future. This

research analyzes the current children needs and alternative teaching methods, as well as the relation of these with the elements of a learning environment, the possibilities of them and how by taking them into account the learning process is facilitated, the educational quality is achieved and the creation of spaces afford children's needs, among other aspects.

1.1 AIM OF THE RESEARCH

Teaching methods and ideas are changing fast but still, most of the students study in the conventional classrooms. Some of the current learning environments are designed for a type of unidirectional and passive teaching without being based on a teaching method while at the same time children's interests, lifestyles, and mentalities are changing quickly as modern methods are made for children to work in groups, explore together or individually, constantly feeding back. However, we easily do not consider how built environments influence children's development and special attention is often not given to the use of specific guidelines for preschool learning environments design, leaving behind the idea of what a preschool garden refers. Unfortunately, the space designed for specific uses is based on the mentality of adults. While the child is a flexible being who is just beginning to discover the world and his/her spaces. Therefore by giving a specific meaning to each space, the child is taken away the opportunity to give it his own meaning. Moreover, classrooms could become scenarios that limit students' learning because they may not have been given good management of classroom design and educational environments are often non-articulated, that is, a large rectangular or square space with one focus of attention.

For that reason, it will be necessary to know how to provide an environment in accordance with age, psychology, development, identity, knowledge, and skills for the children based on effective teaching method. The design of learning environments for children is one of these tools. Thus it is the responsibility of the designers and educators to know the needs, aspirations, and interests of the children. Interior design needs, therefore, be an informed, interdisciplinary process of both, the variables that it incorporates and the ones that can become tools for the development of the child. It is a matter of conceiving the space-school as an educator in itself, generating spaces that invite movement, freedom and

not to silence, spaces designed according to a clear idea of education and not designed by repetition.

This thesis aims to provide interior space design characteristics for an effective learning environment design within preschool classrooms, based on three alternative teaching methods applied in the 21st century learning environments, by providing their definition, objectives, principles, and importance in the present time.

Sub-objectives of the research
a. Afford enriched information for the new coming educational centers, pursuing the development of a functional learning environment, effective design criteria and an interior space design that meets the current needs of the new generation.

b. Determine the current needs of the new generation in terms of education, interpersonal interactions, skills development, role as active agents of the learning process and how these affect in spaces design within preschool classrooms.

c. Provide common aspects between preschool education, teaching methods' principles and elements within learning environments for a better understanding of the importance to improve the quality of early education with respect to the interior design of learning environments.

1.2 TARGET GROUP OF THE RESEARCH

This study focuses on classrooms for preschoolers, ranging from three to six years old, group belonging to the alpha generation (born between 2010 and 2035). Likewise for giving a more specific approach three case studies within Ankara City were taken as a frame of reference to carry out the study.

The present study limitations are determinate as follows,
a. Geographical limitations: study findings will be limited to three preschool classrooms selected in the territory of Ankara, Turkey in order to obtain concrete

and factual information regarding the application of teaching methods in the design learning environments in kindergartens.

b. Targeted group: the study focuses on children aged between three to six years old; both genders.

c. Space limitations: the study is limited to analyzing the classroom as a learning environment within kindergartens, place where children develop their skills.

d. Analysis limitations: the analysis will be limited to STEM Education, Multiple Intelligence, and Montessori Method to provide specific information regarding these teaching methods, which have been selected for their use nowadays.

At present, the majority of preschool children (3-6 years) attend preschool classrooms, where professional in charge work together in order to develop physical, emotional and intellectual development of children. It is, therefore, necessary that this process is carried out in an appropriate environment that provides to the infant the best and suitable facilities for their personal development. At this point, this research discusses and reflects through the history of education which are the most important alternative teaching methods applied in preschool classrooms currently and how the present situation of learning environments allows children to improve their skills and apply the teaching method efficiently. Likewise, this thesis points out the characteristics of the new generation, their needs, opportunities in what learning process refers and what society expects from them; it can bring valuable educational and practical outcomes for the initial period of education process, especially when different disciplines are brought together. This study aims to analyze the main concepts of STEM Education, Multiple Intelligence Theory and Montessori Method and their principles applied in interior space design for the learning environment, in order to identify opportunities and limitations within the learning environment design of existent spaces and generate the best final recommendations that can meet the children's needs and aspirations. Also, the problem examined in this study is directly linked to the fact that importance to learning environments in preschool classrooms have been left behind. The learning environments have not been considered as part of the curriculum at school, however, school architecture contains everything that pedagogy intends to teach and therefore it is necessary to adapt the architecture of the learning environments with the pedagogy for the benefit of the infant. This qualitative research study fills a gap by providing rich descriptive data and insight on the teaching

methods from the perspective of the learning environments design and new generation needs.

1.3 METHODOLOGY

This research is a study of the elements within a learning environment, as well as the implementation of the pedagogical principles of three alternative teaching methods in these spaces. Among diverse methods three of them were selected being these, STEM Education, Multiple Intelligences and Montessori Method, the mentioned methods were chosen because they adapt to the needs of the fast-changing world and technology, cover most of the areas of children' skills development, are flexible in their contents and also are the most applied currently, giving utmost importance to the development of skills needed for a professional in the 21st century. Through descriptive research method, the literature review was done providing the main concepts used for the fulfillment of the research objectives. For the purpose of fulfilling the research objectives was employed the qualitative and quantitative analysis method, presenting a table with the most important points of each alternative teaching methods. Furthermore, for the purpose of gathering accurate information three educational institutions were selected in the metropolitan city of Ankara, Turkey. Each school worked under one of the three selected methods, being these "Minik Devler Anaokulu" – STEM Education, "Maya Çocuk Yıldız" – Multiple Intelligences Theory and "Binbir Çiçek" – Montessori Method. By means of the three study cases, quantitative analysis, data collection and analysis of learning environment interior space design could be done; a survey was administered to a sample group of teachers in order to collect concrete and accurate information. The different schools were visited and through scientific observation, learning environments were analyzed by means of interior design criteria within learning environments, besides, photographs of the learning environments were taken to examine how the elements within learning environments support the teaching-learning process and follow the principles of the three teaching methods. From the data collection, the layout of the learning environments, the elements that contribute to children skills development as features of the learning environment were determined.

Within this framework, designers can have a broader idea of how the design criterion is used in the construction of learning environments with the interaction of teaching methodologies. At the end of the research the outcomes provided from the survey, the visual sources and the data extracted from the literature review could provide the best recommendations for an effective interior space design of the learning environment.

It is also important to emphasize that for the development of a successful study and to fulfill the aim of it, it is necessary to know what a learning environment is, the elements that create it in terms of its interior design. Likewise, recognizing children as the most important users of learning environments, it is therefore important to determine their needs, interests, and their interaction with the environment, for providing the best and more adaptable learning environment that meet their needs and allows the implementation of teaching methods.

CHAPTER II

LEARNING ENVIRONMENTS OF THE 21st CENTURY

2.1 Learning environments Of The 21st Century

Before discussing what a learning environment is we need to understand the definition of learning as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" (Kolb 1984, p. 41) also is the central activity of education entities, sometimes this may take place in classrooms or it can be the result from unexpected interactions among individuals, therefore referring to the term "learning environment", the first thing that comes to our mind is a place, a space such as a school, a classroom, a library, etc. and indeed today most of the learning process is carried out in places like these. However in the present 21st century, we are witnesses of an interconnected world, which is driven by technology, in which learning can be virtual, online or remote, that is, it has no physical place at all even today's students have different attitudes, expectations and limitations from those of ten years ago (Oblinger 2006). Therefore a better way of viewing learning environments is as a structure, tool and a support system for effective learning, which organizes the conditions in which students learn better, according to their needs and interpersonal relationships, inspiring the educators to achieve the necessary skills that the 21st century demands of them and their students.

Experts say that the learning process in the 21st century is based primarily on the relationship between physical spaces and technological systems with learning, which promotes interaction and a sense of community, but even more important is the support for positive human relationships, which are fundamental to the learning process (Partnership for the 21st Century Learning, 2017).

According to the partnership for the 21st century learning, a learning environment is one that allows students an equitable access to tools, technologies and quality learning

resources appropriate to the 21st century, such as support for community and international participation, both physically and online.

So, even though a learning environment seems like one more division, it is rather an integrated system of various provisions that supports learning, this is characterized by:

- Being an environment that promotes human and physical support for the teaching-learning process, bringing with it satisfactory results for both students and teachers.
- It allows students to access essential tools and technologies for quality learning in accordance with the needs and expectations of teaching in the 21st century.
- Through interior design, team learning and individual learning are encouraged, adapting spaces to the needs and demands of the users.
- Integrates professional learning communities, allowing teachers to collaborate and share their knowledge to improve the skills required in the classroom.
- It also provides flexible interior space design and elements adapted to needs and learning methods of the 21st century, which help to improve performances and skills of educators in classroom practice (Partnership for the 21st Century Learning, 2017).

In general it could be said that a learning environment in the 21st century should function as a set of systems that promote the participation not only of the teacher, but the student and the community. It also collaborates with the development of children's skills by providing them with tools and resources that contribute to the implementation of the educational method applied by the educator.

Education as a whole can be flexible enough that could take place in formal spaces like a classroom, where academic formation and development of cognitive, physical and social skills occurs, or well an informal space which regularly is outside the classroom, being those places where students spend a big percentage of their time interacting with family members, friends and peers as well as conversing of academic, work or other topics. At those spaces social interaction, unexpected meetings, and spontaneous talks take place contributing to personal and professional growth of the students (Lomas C. & Oblinger, D. 2006). Nevertheless big attention should be paid to the classroom as a space for development and training of the skills required in the present 21st century.

2.1.1 Space As A Learning Environment

Space rather than an atmosphere, is an environment that projects man and functions as a network of relationships between man, material objects and events. Understanding the space as an environment is to understand relationships between man and environment where he takes part as well as the ability to project himself into it. One of the cornerstones for the early years of child development is the creation of a learning environment that supports children's learning, socialization, interests and needs. It should be understood that a learning environment allows the relationship and practice of the teaching-learning process, being one of the factors that contributes to the development of an optimal learning (Oblinger 2006), it also produces the right conditions to improve students' learning, whether mental, physical or cognitively (Blackmore, J., Bateman, D., O'Mara, J. & Loughlin, J., 2011).

The environment is visualized as a space that possesses an invaluable wealth, following an educational strategy and constituting an instrument that supports the learning process. Space is considered as a living environment, changing and dynamic, that adapts to children's interests, needs, ages and the environment in which they are immersed (Instituto Colombiano de Bienestar Familiar, Ministerio de Cultura de Colombia y Fundación Carvajal, 2014).

Likewise learning environments function as transition spaces where the user experiences a change from his/her life world, a change in the way in which the world is heard, seen and perceived. Therefore, learning environments can be seen as a requirement for the individual to create a space that contributes to his learning (McGraw-Hill Education website, 2016).

It is worth to mentioning within the literature review by the end of the 1990's Cano and Lledó (p.9: 1995) referred to the concept of an educational environment not only as a physical or material space, but also put emphasis on the interactions that took place in it and the capacity to project ourselves into it, especially the ability of children to use and appropriate it. Equally at the end of the 1990's, Coll and Onrubia (1996) defined the learning environment as a structured space in which various elements and relationships are

articulated to achieve the objectives of education, is taken not only as a knowledge-building space but as a an integrated and dynamic scenario that is flexible to time and needs of students (Riera, M., Ferrer, M. & Ribas. C., 2014).

Subsequently, Bonell (2003) said that the physical environment has two main elements, the architectural installation and the environment; which interact with each other to strengthen or limit student learning. In the environment are interrelated objects, smells, shapes, colors, sounds and people who remain and live there; that is why the distribution of classroom furniture, walls, murals, materials, the organization and decoration reflect the activities carried out, the relationships established and the interests of the users (Castro, M. & Morales, M., 2015). This definition reaffirms the idea that within a learning environment, all the elements that compose it are of fundamental importance for the application of the educational methods that strengthen the learning of the students so likewise success or failure of students depends on it. Then Herrera (2006, p. 2) mentions that "a learning environment is a physical and psychological environment of regulated interactivity where people converge for educational purposes" is supported by the idea of having an educational environment that promotes learning and, therefore, the integral development of children. One of the greatest examples of learning environment is the classroom, which according to Riera (2005, p.34) "is conceived as a dynamic and changing space that transforms and matches the needs of its inhabitants" this built environment is one factor in many impacting on student learning outcomes.

The environment beyond providing all the physical facilities must also transmit certain emotions, as it is a significant space for children development, supporting this conception Regio Children and the Domus Academy Research Center (2009, p.24), stated that the environment must allow experiencing pleasure to be used, be explored, empathic and capable of capturing and giving meaning to the experiences of people who inhabit it; in addition, communication becomes a structure that is placed before the architecture at aesthetic and language level (Castro, M. & Morales, M., 2015).

Some main features support the conception of the learning environment as a significant place, as Otálora (2010) points out, a learning environment is significant for the development and growth of the child when it generates multiple learning experiences,

contributes to the construction of knowledge and allows the development of the child. With respect to the aforementioned, a significant educational space is one that:

- It encourages children to be active beings in the world and to be responsible for their own learning process.
- It allows the child to make decisions that allows him to think, know and discover different strategies.
- With the support of peers or teachers, it facilitates the child's problem solving, decision making, learning from failure and self-error.
- It generates spaces of interaction between children for the construction of learning, enrichment of knowledge through collaborative work, recognizing the importance of coordinating actions and thoughts with others.
- It allows children of different ages and adults to be included within it.

We could say that the purpose of creating a learning environment is to encourage children to be protagonists of their own learning, providing them with a stimulating, creative and participative environment where they can act, but also reflect on their actions from an active position that enables communication and the encounter with people who inhabit the space. According to Duarte (2003), the environment should give children the opportunity to learn new skills, face new challenges, discover, create and think. At present, this concept goes beyond and a learning environment is understood as a space of construction, exchange, stimulating and reflective for students and teachers (Riera, M., Ferrer, M. & Ribas. C., 2014).

Along with the concept of space as a learning environment, school concept should be mentioned as well, being this the building that accommodates the main spaces of formal learning and that promote essential human interaction for an effective learning. Schools provide environments that allow children to get to know each other as well as their teachers. By means of arranged spaces, cooperation and interaction are promoted, reducing the intimidation and inattention of the children. Likewise, the school provides the tools and spaces necessary for an effective teaching-learning process (Partnership for the 21st Century Learning, 2017).

For the purpose of fulfill research objectives the classroom as a learning environment has been selected among the areas within a school since it is the space where children spend most of their school day, with the aim to provide more specific, detailed and enriching information regarding how the selected space could be considered as a learning environment.

2.1.2   Classroom As An Essential Space Of Learning

Many times the great importance of the classroom as a place of learning and particularly as a site of power is left aside. Space is seen as a tool of thought and action; in turn within this control and production of power is generated by those who inhabit and will use it (Lefebvre, H. 1991: 26).

The concept of the classroom as an essential space for didactic action is replaced by the concept of the learning environment by the Dutch architect Herman Hertzberger (2008) considered like this by the innovative way to which it relates to space and the various forms of learning. This architectural and of course pedagogical space, provides a variety of scenarios in which both areas for socialization and privacy stand out (Riera, M., Ferrer, M. & Ribas. C., 2014).

The classroom is seen as an essential place in the student development, it could become a space where students love to learn, seek for the classroom when they are eager to learn and transmits emotions and pleasant memories of their learning experiences lived within it. However with technological progress much of the information that students learn is acquired outside the classroom, therefore the classroom should become an interactive and collaborative space where the student actively participates in the making of the learning process (Graetz, K. 2006). In turn the classrooms function as small ecosystems, which needs to be integrated with the surrounding world for optimal functioning, providing access to the development of various skills required nowadays. In many occasions the room is designed so that there is collaboration among students, such is the case of placing the desks in pairs or grouped in a way that facilitates collaboration among students, so the space is composed of flexible furniture that can be reorganized according to the activity to

be carried out. Likewise is important to remember integration of technology as part of the classroom, as it promotes interactivity within it (Lomas C. & Oblinger, D. 2006).

After the aforementioned, it should be remembered the importance of optimizing educational facilities from all possible points of view, with the classroom being a relevant spatial element in the learning process, in which a teaching-learning experience is shared between teachers and students, which includes tangible and non - tangible elements such as interpersonal relationships, the willingness to learn and the teaching that is generated among those who participate in it.

2.1.3　Elements Within Learning Environments

Students learning is linked to educational objectives and practices that have been changing according to the teaching methods applied within the classroom. From this, there are some particular elements that should be taken as examples of features of the design process for classrooms, being those related to flexibility, comfort, aesthetic, creative, prioritize the learner, integration of technology (Romo, 2012), considers the development of students' skills, involves the community, promotes interaction with the environment and works as an intermediary of thoughts and social relationships that adapt to the diversity of teaching methods and the different intelligence of each student, besides are linked to desirable student outcomes and educator pedagogies (Riera, M., Ferrer, M. & Ribas. C., 2014). The challenge is to create environments suitable for each age, that become originators of relationships, invite people to act within it and facilitate the construction of knowledge, thus with respect to what is mentioned, have been suggested a number of elements that should be considered within the learning environment design to fulfill the goals of education.

2.1.3.1 Flexibility

In a changing world, in which we cannot determine how educational technologies and learning environments evolve, that is why when designing, we should take into account that spaces must be flexible to adapt to the possible changes that future could bring, as well as the different multimodal pedagogies, that is why the ideal when designing

is to take into account the flexibility of space. With the purpose of incorporate flexibility in the designs, today's interior architects integrate movable furniture and walls that can be reconfigured to create different spaces according to the users' needs (Partnership for the 21st Century Learning, 2017).

Though one of education problems is that the conventional classroom has tables and chairs placed in rows and projected to the front, limiting the mobility of the instructor and student within the classroom as well as the application of the teaching method, students' needs and ways of learning, however flexibility allows different teaching and learning styles to be applied within the classroom, accommodating diverse flexible spaces with various approaches and uses, providing opportunities for effective learning (Lomas C. & Oblinger, D. 2006).

When thinking in a learning environment in the 21st century this should be flexible pedagogically and physically, but also should consider the followings:

- Provide an environment where students are the protagonists of their own learning, they choose the time and place to accomplish the work, projects and conversations to have.
- Allows accessibility and openness, promotes cooperation among students, reduces inattention and shyness and in turn it provides spaces for teachers, where collaborative planning and exchange of information are carried out.
- It should also inspire intellectual curiosity; provide areas in which children can get to know each other and their teachers, promoting crucial social interactions for successful learning (Partnership for the 21st Century Learning, 2017).
- Supports educators by making easier the application of different teaching strategies, including more student-center options, so that it can easily accommodate changes in technology and adapts to current teaching methods. It is recommended that the furniture should be modular and can be reconfigured quickly and easily.
- Likewise it is ideal that tables are movable and allow educators to reconfigure the space adapting it to the teaching method used (Souter, K., Riddle, M., Sellers, W., Keppell, M. & Pirotta, N., 2012).

The flexibility of space and time gives the child the opportunity to improve and advance according to his level of development, delighting in what he is most interested in and responds to his needs at the moment. Reiterating, flexibility in learning seeks students to build their own learning at their own pace from play, experimentation and cooperative work (Riera, M., Ferrer, M. & Ribas. C., 2014).

Additionally an environment establishes and is established by the actions of the people who inhabit it, that is why space is flexible, updated and adapted to the needs of students and educators is of the utmost importance for the learning process. From this perspective school is comprehended as a place that satisfies physiological needs, allows the development of each student in terms of affective-emotional security, self-confidence, responsibility, motor development, language, space-time organization and also in the acquisition of knowledge to compare, relate it easier for children to express their decisions and opinions (Castro, M. & Morales, M., 2015).

2.1.3.2 Comfort

Discomfort in the classroom favor children to become easily distracted, which not only harms them in knowledge creation but also prevents the educator of fulfilling the pedagogical objectives while teaching. According to Bateman (2011) by increasing comfort for students and teachers, it is assumed that teachers and students will be able to concentrate on the task at hand.

As mentioned above a flexible space is subject to changes; however we should consider that those should be small changes since it is possible to cause stress and feelings of insecurity in children, affecting their comfort. In order for a space to be comfortable, the following aspects should be reflected;

- It should encourage interaction among children and educators, as well as providing a sense of "life". This can be through furniture, objects and comfortable materials for educators and students; likewise integrates beauty and aesthetics into its design.
- It is recommended to use natural objects from the environment, as they teach children to remember the value of plants, trees, gardens, that is, to value nature and appreciate its beauty.

- Avoid noisy and colorful floor coverings, curtains and excess colors in favor of more neutral colors, as these create an optimal setting to learn (Stonehouse, A., 2011).

However, comfort goes beyond the type of furniture and materials, moreover, when designing a learning environment should be considered spatial organization, as this influences the possibilities for movement and consequently, physical behaviors of childhood in the environment, therefore it is important to know the spaces that we possess and the purpose of each of them, in order to constantly evaluate the interaction of students with the environment and the elements that shape it.

This is confirmed by Duarte (p.106: 2003) who argues that there is an "enormous coincidence between the structure of relationships and spatial disposition, an element of great importance to foster learning environments that allow individuation but also socialization" among children, teachers, administrators, parents, community, etc., (Castro, M. & Morales, M., 2015).

Therefore, defining a comfortable space is that one which through its design allows students and teachers the flow of ideas and facilitates the learning process. It also includes elements that contribute to create a comfortable environment, such as heating and cooling, comfy chairs, natural light, artificial lighting and acoustics (Souter, K., Riddle, M., Sellers, W., Keppell, M. & Pirotta, N., 2012).

2.1.3.3 Aesthetics

Both feelings of identification with the school, educational space and positive or negative messages received by the students are transmitted through the appearance of the environment that surrounds them (Blackmore, J., Bateman, D., O'Mara, J. & Loughlin, J., 2011). Therefore aesthetics must be fundamental when designing; a physical environment is part of the curriculum, this in turn must be attractive, that is, it needs to attract and encourage children so they become active agents in the teaching-learning process.
Providing the best space aesthetically speaking is possible by taking into consideration the next features:

- Includes interesting elements to see, to touch and allows to have contact with the environment, avoiding excessive spaces, objects while for walls and materials not too bright colors are used.

- Provides materials are flexible allowing diverse uses for their manipulation. This is significant if children of different ages coexist in the same environment, since the interests and abilities of children vary.

- Balances order, so that children's play and commitment are constructive, providing areas for particular experiences that contribute to the children's commitment, as long as educators are flexible about what is happening.

- Connecting the interior space to the outside world through natural light, outwards views, stimulating creativity and promoting collaboration.

- Offers a wide variety of accessible materials and equipment, organized within an environment that provides integrated learning opportunities that facilitate the interaction of children with educators and permits children to be supervised at all times (Stonehouse, A., 2011).

For this reason, it is fundamental that a school formation attributes importance to aesthetics during the learning process and recognizes it as a necessity and right of the students and adults who live in the classroom. In this process, the role of the teacher is essential, as her attitude, behavior and performance in the classroom influences the motivation and construction of student learning.

As an element related to the aesthetics of physical space it is important to point out the great influence of color on the student's life, these affect the emotional states, which provoke different responses that will incite calm or excitement, cold or heat, joy, sadness, or other positive or negative feelings. Therefore, when choosing the colors for the interior spaces should be considered to be easy and natural visibility, provide comfort to the environment, provide a sense of calm, facilitate concentration during lessons, stimulate academic performance and prevent negative emotional reactions.

In line with the above, decoration of the classroom seems to be a remaining issue in relation to others of more importance within teaching-learning process; however, decoration fosters motivation and learning, also generates a sense of well-being and

warmth in the classroom spaces by the different types of visual stimulation that the colors cause, the type of figures, the thematic illustrations and the extra elements used for it, generate; it should be taken into account the age of the student while involve them in preparation and selection of the decoration encouraging creativity and imagination. This idea is reinforced by Reinsberg (cited by the Union of Private Institutions of Childcare in Costa Rica, 1999: p.63), who points out that classrooms should have a "warm and pleasingly decorated atmosphere, so the teacher should give to the institution and her class a welcoming aspect, offering children emotions of aesthetic order " (Castro, M. & Morales, M., 2015).

2.1.3.4 Learner Centered

Children have the right to grow in places where they feel they own and are comfortable with what surrounds them. For the development and quality of the environment it is necessary the organization, functionality, attractiveness and impact of it within the learning process, reason why the educator should be aware that everything in the classroom is directed towards student learning process. An environment that favors the student's development allows the child to build and exchange meaningful experiences, to feel safe while being flexible, providing areas for socializing, getting dirty, interacting with the environment, meeting their needs and performing activities that contribute to the construction of meaningful learning (Castro, M. & Morales, M., 2015).

One of the main objectives of the educational institutions is to organize the physical space according to its goals and priorities, seeking for student's success and recognizing space as an important factor affecting learning (Nota, N., 2006).

Similarly, a student-centered learning environment respects children's skills and competences, which in turn provide opportunities for them to develop their own judgment, make their own decisions and act independently of adults. Also in a cooperative learning environment, interpersonal skills necessary to work effectively as a team are developed, enabling students to participate in discussions in which they share and solve their personal problems (Stonehouse, A. 2011), however a learner centered or personalized environment is not only about owning a place but developing good individual relations with student,

teachers, about community inclusion recognizing student diversity and individual learning needs and preferences.

Skills and competencies that are promoted in a student-centered environment provide many opportunities for them to make their own decisions and act independently without resorting to adults. According to Souter, K., Riddle, M., Sellers, W., Keppell, M. and Pirotta, N. (2012) collaborative approaches to learning, research and study should make use of technologies and approaches that students prefer, at the same time the student-centered learning environments provide aesthetic for development of knowledge, organized to accommodate the learned information. A learner-centered environment is characterized by:

- Boost in children the ability to decide by themselves whether to work on their own, in small or large groups, this is provided with large open spaces. Therefore, it is recommended to create areas using furniture and technology as part of it, to encourage children to disperse and be together by choice.
- Promote the concentration of children through not very noisy areas, intended for learning experiences.
- Contribute to confidence and security feeling of children to encourage them to act for themselves according to their interests and desires. For this, the furniture should be appropriate to students' height and accessible to all.
- Allows to recognize the children efforts through exhibitions of the work done, involving the students in the decision making regarding the exposed work (Stonehouse, A., 2011).

Therefore it needs to be known that the key to students' success is not only in the hands of educators, but is often in the physical spaces, that is to say, environments that provide feedback, promote and evaluate skills development, supports team learning, as well as multidisciplinary and interactive learning, integrating students and teachers enriching learning experiences for both parties. For that reason what is really needed are flexible, aesthetic and functional spaces interconnected and designed to support students' learning (Dittoe, W., 2006).

2.1.3.5 Community Involvement

As previously seen, learning can take place outside and inside the school. Learning is seen as community practice in which educators and children interact among them, by having shared experiences, it is for that reason that learning in the community must be considered by the society and the educational institutions, as it also prepares students for their future working life by providing them with opportunities to acquire knowledge in a distributed network of different communities, teaching them to live and work in a world in which collaboration is required (Bickford, D., & Wright, D., 2006).

Firstly it is needed to know that a community is a group of individuals that share ideals and purposes, which stimulates interaction among members, leading them to learning. In education, the collective setting of students and their surroundings is considered as a community that shapes learning. The importance of community for education is often forgotten, without realizing that students learn better in community, that is, through collaborative learning and student engagement. Although learning is mostly a change of individual behaviors, the environment in which it takes place is a social environment involving not only one but different people (Bickford, D., & Wright, D., 2006).

Community should be included in all aspects of education, including the design of the learning environment, as individual learning is important, also the role of social interactions within the educational community is; it is why both physical and virtual spaces are seen as tools for improving student learning and commitment.

At present community involvement is necessary for creating spaces that form a solid basis of learning, that promote communication, key to sustain a community of active students in learning, this through flexible spaces that allow students choose and place furniture in order to have movement within the classroom and to communicate with each other (Bickford, D., & Wright, D., 2006).

Learning environments are considered to be a second home for future citizens who in the future will be responsible for local economy, workforce and future leadership

(Partnership for the 21st Century Learning, 2017) it is therefore fundamental to evaluate how virtual and physical space improve learning and student commitment in the community (Stonehouse, A., 2011).

Moreover at involving children, they can take control over their own learning and the use of the learning environment (Gee, L. 2006). In order to support children's development, learning environments should consider the following points for the inclusion of community in the learning environment

- Should work for families and educators; considering and involving children, families and teachers point of views on how to achieve excellent learning environments, strengthens the sense of belonging and community (Stonehouse, A., 2011) it is for this reason that the inclusion of educational associations within the community strengthens the links of the environments with the adults of tomorrow.

- Should be flexible, allow productive learning and participatory work opportunities among children, as they learn from interaction with other children as well as with educators. Flexible spaces support human bonds, which are indispensable for education, at the same time promote continuous learning through play, creative use of time, extensive range of technologies that support collaboration between the school community and the outer world (Partnership for the 21st Century Learning, 2017).

- Within the classroom there is the possibility of creating and strengthening relationships, creating a small educational community when children interact with children of different ages as well as adults, through work by corners or environments where children work as a team, sharing time and space among them and adults, think aloud expressing their desires and sharing their discoveries, doubts and concerns (Riera, M., Ferrer, M. & Ribas. C., 2014).

Currently a learning environment of the 21st century reflects the aspirations, culture, values and respect for the community; also it gives and receives support from families and local community generating positive results within learning environments, among these we could mention that children improve their academic performance when their parents are actively involved in their education, academic performance is stimulated through community programs that promote children development, when community

services are integrated the school becomes a place where the ability to overcome adversity in children is promoted and at the end of the school day, learning opportunities contribute to student achievement and development (Partnership for the 21st Century Learning, 2017).

It is for this reason that participation of adults recognizes and encourages the child's reasoning, problem solving, and creativity (Hohmann, M. & Weikart, D., 1995).Lastly the importance of community inclusion in learning is based on what is mentioned by Blackmore and Kamp (2008) learning is adversely affected if students feel excluded or unconnected, which is due to a number of factors such as discrimination, poor health, lack of control in schools and among others the exclusion of parents in student learning, this is why both participation and inclusion in the community is of extreme importance for education (Riera, M., Ferrer, M. & Ribas. C., 2014).

2.1.3.6 Encourage Independence

The aim of a learning environment is to encourage children to be protagonists of their own learning process, to create and provide a stimulating, creative and participative environment, where children act but also think from an active position on their own actions and allows them to communicate and encounter with people who inhabit in it. According to Duarte (2003), the environment should give children opportunities to get new knowledge, to face new challenges, to discover, to create, to innovate and to think (Riera, M., Ferrer, M. & Ribas. C., 2014).

Also through the way space is distributed, areas can be created where child is encouraged to be the owner of these, also within these spaces is given the opportunity to express their tastes, preferences and even more important to make mistakes and try again. The space invites the children to move and decide independently the areas and materials with which they want to interact, in turn children should know that all occupants have a voice in the definition of space. Children should be educated about how to use materials, furniture and space to their fullest potential for an efficient learning process. To foster independence in children the following aspects should be taken into consideration:

- Furniture as one of the fundamental elements in the promotion of independence, since its placement and flexibility, allows users to manipulate and rearrange it.

- Environment organization should motivates children, create curiosity in them and encourage them to be autonomous, this could be achieved with open spaces, there they could take some control of what they are doing.

- Within the learning environment it is important to have areas that promote the independence of each child and that this in turn they can share with their peers.

- Supportive spaces for everyone in order to develop all children potential, as also to express and participate in different activities.

- Elements such as windows or doors allow the exit and contact with outside areas to provide them with freedom.

In general the child who increases his own independence with the acquisition of new abilities, can only develop normally if he has freedom of action (Gee, L. 2006) therefore it could be say that a learning environment goes beyond a simple decoration and provision of materials within a physical space, as it works as an efficient design involving the planning and organization of education with a clear pedagogical objective and in accordance with the characteristics, interests and needs of learners and the context in which they are immersed. This is why learning environment should encourage students to act by themselves, to become independent beings responsible for their actions and decisions.

Finally, De la Peña (2006) considers motivation towards learning as a process determined by the needs and impulses of the individual, aspects that could be fostered by an effective environment design, at the same time this motivation originates the will to learn in general and involve the desire, for which both students and teachers require certain actions before, during and at the end, which positively affect the willingness to study and learning-teaching process in general (Castro, M. & Morales, M., 2015) reaffirming, a learning environment should be designed in parallel with teacher aims towards student independence and skills development for the purpose of education.

2.1.3.7 Creativeness

Creativity is considered a product of diverse ideas in a cooperative context; through cooperative and constructive learning the number and quality of ideas increases, as well as the motivation, enjoyment and originality of expression in problem solving (Johnson, D. & Johnson, R., 2010).

A learning environment should motivate and inspire students and educators through creativity, this could be achieved by

- Innovating and modernizing learning and teaching practices through the inclusion of new technologies, collaborative and active learning within the educational spaces (Bocconi, S., Kampylis, P. & Punie, I., 2012).
- Materials represent another relevant component in the physical learning environments, for what it is necessary the selection of materials and equipment that promote integral development, facilitate quality experiences for the learning process, while stimulating creativity, exploration, manipulation, interaction and integration with cultural diversity. It is essential to point out that the existing materials and tools founded in the environment are an option of low economic cost resources and can be used creatively favoring cognitive, affective and social learning (Duarte, 2003: p.107).
- Through infrastructures, the limits of physical learning environment can be enlarged, by designing, ordering and taking advantage of the elements with which we count as lights, colors, sounds, etc., in order to facilitate and inspire innovative teaching and creative learning (Bocconi, S., Kampylis, P. & Punie, I., 2012).
- Promoting contact with the outdoors and nature, so that children become more conscious and independent, capable of solving any problem in a rational and creative way.

As we could see creativity could be applied in different ways within the learning process and space. According to Otalora (2010, p. 80), creativity in an learning environment stimulates the acquisition of multiple intelligences, it strengthens the affective, social and cognitive competences necessary to creatively cope with the

increasing demands of the 21st century during the first years of life, being these the basis of the future generation.

2.1.3.8 Combines Digital And Physical Environment

Nowadays we live in a digital world in which student expectations, pedagogical approaches and technology are constantly evolving, at the same time students want to connect and communicate constantly and seek for an environment that supports these connections. The current and coming generation of students expects continuous technology use, whereby technology should be flexible and adapted to demands of new generations both within and outside of learning environments. Therefore current design practices should be flexible, focusing on the active design of the learning environment, to successfully benefit from their facilities (Milne, A., 2006)

A little more digging into the importance of it, we find that according to Basye, D., Hausman, S., Grant, P. & Johnston, T. (2015) technology can contribute to a deeper learning of content, the development of important skills for the digital age and with the integration of technology into educational spaces more complexity to an ecosystem in which learning takes place is added. Technology enhances cognitive, affective, behavioral, academic, and social commitment of students, and in turn increases skills and dispositions such as taking initiative and responsibility to learn, using resources wisely, time on tasks performance, interests and desire to learn.

By incorporating technology effectively into administrators, educators and students' routines, should be done systematically and with the necessary support. Technology should be integrated as part of a carefully organized teaching-learning process, so that the benefits to students and educators allow continuous development, expand the scope and flexibility of what the institution provides and foster a culture that embraces the potential learning of all its members. Technology has an additional benefit of supporting other systems that constitute a learning environment for the 21st century (Partnership for the 21st Century Learning, 2017).

A 21st century learning environment which combines digital and physical environment, could be created by

- Merging physical and digital infrastructures to effectively support the learning process (Partnership for the 21st Century Learning, 2017) by combining a range of tools and opportunities for the development of different teaching methods and incorporating e-learning into active learning experiences within the classroom, a goal-oriented learning curriculum is created (Souter, K. Riddle, M. Sellers, W. Keppell, M. & Pirotta, N. 2012).

- Integrating the furniture and existing physical space, such as the whiteboards that are used to project what is seen on the laptop, tablet or net book while facilitating learning process at the same time, this because access to technology produces interactivity and connectivity with other learning methods and technologies, (Cilesiz 2009).

- Allowing students to explore and work through the content of the course at their own pace by using screen casts, e-books, iPad, etc.

- Fostering skills by using apps specific to different areas and multifunction devices that not only facilitate learning process but creates better learners and stronger schools.

Referring to the physical space, the learning environments have evolved over the time in spaces with an integrated layout where technology is used as a pedagogical tool that contributes to the development of the class, a support for educators and to the development of students. Unlike other aspects of teaching, technology is constantly changing, so it is vital that educators stay current with advances in education, new trends and new technologies.

The incorporation of technology into learning environments and education, are part of an environment in which combined learning turns the educator into a facilitator and a coach, learning combines elements online and face-to-face, is also considered an excellent learning method, when best practices in pedagogy, technology and space are considered when designing the learning experience (Milne, A., 2005). Students when interacting with living and learning environments, involuntarily combine two reachable worlds, a physical and a virtual world (Lomas C. & Oblinger, D. 2006), that is why we should remember, the

spaces are defined not only by passive elements and patterns of use, but also by the nature of the dynamic digital contents with which we interact within these spaces. The combination of physical space, patterns of behavior and the technology used in it, defines the experience as such, giving character to space (Milne, A., 2006).

With the inclusion of technology in education, new opportunities have appeared for learning, either by stimulating more personal or virtual interaction. Similarly we know that today the process of learning can take place not only in physical spaces within the school. Increasingly, schools are concerned about providing spaces in which technology can be used by students and educators, in order to give added value to education, supporting active learning and students to be able to integrate it into the development of multiple activities. As we understand how students learn, how effective learning environments have changed and how design is a process not a product, participants get involved for the improvement and development of these spaces, it is why increasingly, these spaces are becoming flexible and networked, taking with them formal and informal activities in an environment that recognizes that learning can take place anywhere, anytime, in physical or virtual spaces (Oblinger 2006).

In other words, educational technology is most effective when it functions as part of thoughtfully composed system that includes effective curriculum and instruction, ongoing professional development, authentic assessments, and a culture that embraces the learning potential of all its participants. Technology has an extra benefit of supporting the other systems that make up a comprehensive 21st century learning environment (Partnership for the 21st Century Learning, 2017).

2.1.3.9 Contact With Outdoor Spaces

In pedagogy, the play is considered elementary for the acquisition of physical and cognitive social skills. Children who engage in play or outdoor educational activities usually develop a more creative imagination, their immune system is stronger, stress levels are much lower, they have energy for longer periods of time, have a healthier life, their level of concentration increase and they are more respectful of themselves and others. The spaces specifically designed for outdoor activities offer benefits not only for health but also

for early childhood education. Within these spaces, children show higher levels of energy, than those that demonstrate in an interior space (Spencer, K. H. & Wright, P.M., 2014).

As mentioned above with the incorporation of play in pedagogy the acquisition of cognitive and physical social skills takes place, the school acquires an added value offering a place where knowledge is shaped. For the design of these spaces it is necessary to take into account security and privacy measures for students, as well as the following suggestions;

- Considering physical aspects as the location of transitional spaces and connection between external and internal areas, being these the external and internal corridors. Their location should facilitate the physical and visual contact of the inside with the outside also they should motivate students to interact with the outdoor spaces (Meek & Landfried 1995).

- Making available an extensive variety of play equipment for children, challenging and inviting to support children's play where some shady spaces are available for children with the use of trees, canopy or parasols.

- Including appropriate play areas for their development, where children can have different enriching experiences that contribute to their learning; usually a combination of fabricated equipment and other natural materials is offered.

- Promoting contact with nature so that children learn from the varieties of species that compose their natural surroundings, gives them a friendly, beautiful and diverse environment where they can witness the cycle of life, perceive and discover new smells, textures, flavors, etc. (Spencer, K. H. & Wright, P.M., 2014).

However in some cases, the educational importance of playgrounds and their positive effects on learning are underestimated. These are a fundamental part of the social world of the child, where he can create new spaces for individual and group play, according to his previous knowledge and experiences gaining more confidence in himself, in the same way movement and games contribute to development of knowledge and understanding of the natural environment (Riera, M., Ferrer, M. & Ribas, C., 2014). Through these spaces it is possible to promote the participation of children, parents and community by involving them in the plant of trees, flowers or fruits in the garden, also children develop motor skills necessary for the future and this by manipulation and

experimentation with materials in different ways from those that would be in indoor spaces (Spencer, KH & Wright, PM, 2014).

To conclude the outdoor environment is not only a space to exercise the muscles, but an organized space where interpersonal skills are developed as well as the sensory exploration, imagination and value of nature are promoted, offering to children the experience of a natural environment.

2.2 Education In The 21st Century

With the new digital era and technological advances, new learning styles have emerged nowadays, some are based on games, immersive and/or interactive learning, offering new alternatives within learning process allowing students to broaden their knowledge. Also common pedagogical methods are giving way to newer approaches. This is because 21st century students are growing in a different era, they are influenced by a society that evolves having access to video games, text messages, emails, that is, they have different characteristics, expectations and ways to communicate. For that reason engaging effectively with today's students should involve new strategies and approaches (Parkinson, E., 2015).

Along with evolution of society education has also been changing, words have been replaced by icons and images, textbooks by tablets, reports by presentations and traditional classrooms by collaborative means. Communication works as an effective strategy that allows students to expand their knowledge and experiences, developing their social, emotional and creative language.

Concerning the preschool students of the twenty-first century, known as alpha generation, they are well known as one of the most literate generations from the technological point of view and with social power. Characterized by being highly intuitive and confident users of digital technology, they value visual and interactive communication with quick and easy access to information (McCrindle, M., 2016). Therefore is expected that education system to develop individuals skills, personality formation, life skills and flexibility.

Fortunately schools nowadays are being redesigned going beyond the traditional classrooms as the learning environments of the 21st century provide a rich mix of media, devices and tools that are included into design process for the interior of a learning environment. A school of the 21st century not only meets academic needs; it functions like a small city, providing food, facilities, health, security, transportation, and recreation facilities for its students (Partnership for the 21st Century Learning, 2017).

2.3 The Child Of The 21st Century As An Active Agent

In order to solve problems in our complex and changing world, children must become agile and creative thinkers able to meet the future society requirements. As is well known children are curious by nature, their interests, doubts and intentions lead them to the exploration, experimentation and construction of new knowledge, which leads them to generate hypothesis by working with diverse materials to create experiences and results personally meaningful, which later on they will share in their own words. That is why children are considered as active agents as they build their own knowledge of the world, changing their ideas and interactions into logical and intuitive sequences of thought and action.

Children are the creators and inventors of products that develop their own knowledge; sometimes it happens that children's creations seem very disordered, unstable or unrecognizable for adults, however, these are the product of their thought development and it is the way they come to understand their world (Hohmann, M. & Weikart, D., 1995). Mentioning citizens of the 21st century think and act differently than citizens of ten years ago, they think critically and creatively, are eager to discover the unknown and create as well as consume information. In today's world they need to be creative and self-reliant, while also skilled at collaboration and group integration. It is important for them to understand the environment that surrounds them as the many components of the modern world and be fluent in various forms of communication (Partnership for the 21st Century Learning, 2017). As a result children are becoming active agents participating in learning process, taking the lead of education leaving the role as facilitators to educators, learning by themselves and applying their knowledge into different experiences they face in their lives.

2.4 Generations

Within marketing experts are dedicated to forecast trends that indicate how the generations are composed, these being a group of individuals that for them are seen as a commodity in a database that will subsequently be transformed into a product or unit manufactured that will be commercialized (Rebolledo, RA, 2017). Definitely, youths of different eras demonstrate similar characteristics, but the events that are lived at a certain moment are what shape a generation considering it as a result of the reactions to these events. Generations are defined sociologically rather than physically. A generation is refers to a unit of people born in a similar period of time and shaped by it (McCrindle, 2009).

In turn, several researchers and consultants write about generational differences by presenting a diversity of names to recognize the different generations, which is why the terminology implemented to tag the generations hasn't been standardized and disagreements are presented from the authors about what period of years must be encompassed within a generation. Despite this, most authors agree that there is a big difference between the distinctive characteristics of each generation.

The majority of experts agree that the differences between generations are more than all shaped by history than by chronological dates. However, several generations may witness the same events, but the age at which they are exposed to them is what determines how adapted one's psyche and worldview are (McCrindle, M. 2009). As stated by Howe and Strauss (2000), three are the properties that identify the characteristics of a generation, being these:

- Perceived membership: consists in the self-perception of belonging to a generation, beginning during adolescence to adulthood.
- Common beliefs and behaviors: it involves attitudes and behaviors toward family, personal life, work life, politics, religion, etc.
- Common location in history: include the most relevant points in historical trends, for example wars, political elections that take place during the formative years of a generation.

In spite of the different researchers who have studied the generational differences, the works of Neil Howe and William Strauss are the most mentioned because of their plenty studies of the human behavior and discussions of the other previous studies (Reeves, T. C. & Oh, E., 2007). As demographers William Strauss and Neil Howe defined in their books Millennials Rising (2000) and Generations (1991) "A generation is a group of people who share a time and space in history that lends them a collective persona". Likewise it could be said that a generation is the result of events or conditions according to which period of time its members are living. As a generation ages, their attitudes, behaviors, and interests change, as these are related to memories, language, habits, beliefs, and life lessons. Today up to seven generations can coexist in a single environment; therefore, a good understanding of each generation is the key to successful workplaces, businesses, homes, classrooms, etc., considering the differences between them. In order to obtain a better understanding of these, we can resort to generational segmentation, this being a process of analysis of the population by its generational cohorts, so it is in this possession of a good understanding of the generational segments and sub-segments within these generations that managers, employers, leaders, teachers and salespeople can be more effective (McCrindle, 2009).

Therefore if our purpose is to provide the best for the present and new generations, we need to know about the current groups that inhabit our world today, according to Mark McCrindle generations are segmented as follows:

- Federation Generation: is the oldest living generation currently and the first to be considered and outlined, started in the year Australia became a nation (1901), hence their name. The last of this generation were born in 1924. They witnessed some of the most significant events such as the Depression and the World Wars.
- Builders: were born between 1925 and 1945, in the course of the Depression and the war years. They were considered as 'greatest' and 'lucky' generation because of the comfortable years that followed World War II.
- The Baby Boomers Generation: they were born between 1946 and 1964; this generation was born into the high of the postwar boom and the civil rights movement (McCrindle, M. 2009).

- Nomad/Reactive: also known as the Generation X born between 1965 and 1979 inclusive. They lived out their young adult years in the pre-September 11 world of relative peace and prosperity.

- Generation Y: also known as the Millennials, born between 1980 and 1994 inclusive. This generation has spent their young adult years during a crisis period of post-September 11.

- The Generation Z: known as the Zeds, born between 1995 and 2009 have been born into the crisis period of terrorism, the global recession and climate change. They are predicted to spend their young adult years in a time of economic and social renewal (McCrindle, M. 2009).

Detailed information regarding some characteristics of these generations is provided in the following table

Table 1. Generations Defined

Generation name	Builders	Baby Boomers	Generation X	Generation Y (Millennial)	Generation Z
Birth years	1925-1945	1946-1964	1965-1979	1980-1994	1995-2010
Aged	Aged 70s - 80s	Aged 50s - 60s	Aged 30s - 40s	Aged 20s - early 30s	Aged kids - teens
Training focus	Traditional On-the-job Top-down	Technical Data Evidence	Practical Case studies Applications	Emotional Stories Participative	Multi-modal eLearning Interactive
Learning format	Formal Instructive	Formal Instructive	Spontaneous Interactive	Multi-sensory Visual	Student-centric Kinesthetic
Learning environment	Military style Didactic & disciplined	Classroom style Quiet atmosphere	Round-table style Relaxed ambience	Cafe-Style Music & Multi-modal	Lounge room style Multi-stimulus
Ideal leaders	Authoritarian Commanders	Commanding Thinkers	Coordinating Doers	Empowering Collaborators	Inspiring Co-creators

Reference: McCrindle, M. 2012, Generations defined.
http://mccrindle.com.au/resources/Generations-Defined-Sociologically.pdf

Even though at this time Millennials is the largest generation and they have experienced the most drastic changes in technology, we should consider also to the new coming generation, our future society which according to Mark McCrindle is known as Generation Alpha. Members of this generation were born between 2010 and 2035. They are predicted to be one of the most technologically literate generations so far. However in the next point detailed information about them is provided.

2.4.1   Generation Alpha And Their Characteristics

According to Mark McCrindle Generation Alpha is anyone born between 2010 and 2035, they are the children of Gen Y and the most transformative generation ever. Not only the members of the Alpha generation represent the center of their parents life, due to being multi-tasking beings constantly changing, but also this generation is more likely to grow up overindulged and is expected to be the most technologically literate generation so far (Carter, C., 2016) also due to one-child families increase alphas seem to be growing up selfish and expecting gratification from everywhere.

According to a study done by David Berkowitz (2016) after observing a member of Alpha generation, he concludes that some of the characteristics of an Alpha are:

- They are likely to be anti-sharing when it comes about economy and anything they have, usually they are likely to shout exclamations such as "mine!" and "all mine!"
- They tend to be very active and in constantly movement except when they are stationary. At the same time they will be in constant change and evolution.
- They don't care about privacy.
- They do not follow rules, they feel they have control and they concentrate on living the moment. Likewise by not following rules, they will avoid organized religion
- They will be in constant change and evolution as so the products and devices they use, for example jewelry, shoes and accessories.
- Alpha generation members prefer touchscreens to operate devices. They will pick all technologies and devices such as books with taste sensors.
- They will be more entrepreneurial and better prepared for big challenges than previous generations; they will break boundaries without being limited (Berkowitz, D., 2016).
- Their knowledge of technology will be broader compared to previous generations.
- Most activities that involve social interaction like shopping, sales, interviews, calls will be mostly online and will have less human contact than other generations.
- They tend to be more auto-efficient, without asking for someone else's help or opinion (Rebolledo, R.A., 2017).

Within 2010 and 2035 massive technological changes will occur, for instance we already can witness that Alpha kids are growing up with tablet computers and smart phones in hand which leads them to have the ability to transfer a thought online in seconds. McCrindle says "Now, the individual has great control of their lives through being able to leverage this world. Technology, in a sense, transformed the expectations of our interactions" (Sterbenz,C. July 25, 2014).Even though preceding generations also used technology, Alphas will spend great part of their formative years entirely immersed in it, due to the fact they are interacting with these technologies at much younger ages than any other generation. As McCrindle says "They don't think about these technologies as tools, they integrate them singularly into their lives." (Sterbenz,C. July 25, 2014) at the same time inclusion of technology has contributed to make easier the communication process, with the time alphas will prefer to communicate via images and voice control over tapping and text to others. Even though most of them haven't born yet, they are social media apps and technology influencers, most of the big companies base their devices or applications layout on what Alphas most likely will use (Carter, C., 2016).

According to McCrindle the Alphas are the most advanced and updated generation because they are entirely familiar with everything that happens on the web, technological advances and electronic devices. Existing and future Alpha members are being born in an environment in which technology prevails first and with the evolution so continuous of the world having Millennial as the largest generation nowadays, but it is estimated that the generation Alpha, that is to say the children of the millennial, will be more than the past generations. They will have more young people and more competitive in the labor market compared to other generations (Reeves, T. C. and Oh, E., 2007). They are truly the millennial generation; since they are the first generation completely born in the 21st century, known as digital natives, will be the generation with greater technological knowledge in comparison to the others, as well as the most endowed materially. Likewise, the Alphas are characterized by being a freer generation that does not like boundaries or rules and will be in continuous change. It will be the most formally educated generation in history; they will begin to educate earlier and longer than previous generations. They will be more innovative than previous generations, more self-sufficient, better educated and prepared for great challenges (Carter, C., 2016).

Providing an effective education to the new generation as well as achieving quality in the learning environment rest on other factors such as the application of teaching methods and the interaction of student and teacher with the environment. Since learning is multifactorial and complex, it demands the existence of minimal environmental conditions, especially because the environment teaches for itself (Castro, M. & Morales, 2015). Education means for the educator as for the student the reception or transmission of a previously existing social knowledge. What is sought is to achieve the most effective classroom experience to catch the interest of students, generate motivation and meet learning process objectives. Therefore, it is crucial to recognize the current importance of teaching methods, which are the most successfully applied and how they interfere in the education and design of the learning environment.

CHAPTER III

ALTERNATIVE TEACHING METHODS OF THE 21st CENTURY

3.1. Education

Human culture is a process according to specific objectives related with the general concept of education. During this process a change occurs in the personality of an individual. Through this change occurs education knowledge gained in the process, skills, attitudes and values as well. Training is a part of the culturing process in society. The culture is carried out as part of training through a program made previously. Therefore, education is also called intentional culturing process (Fidan & Erden, 1998:13)

In a narrower concept education is limited to the school and the University instruction, starting from the day a child is admitted in a school and it ends when the child completes studies and leaves at the college or University stage. This type of education is intentional and is influenced by the environment in the one the child is being educated, everything is pre-planned and education is given in the class room (Rather, A.R. 2004:5).

3.1.1. Preschool Education Concept

Preschool education; "It covers the years of childhood, from birth until the start of primary school, according to the individual characteristics of children at this age and level of development, providing opportunities for a rich and stimulating environment, is an educational process in which occurs the whole development of cultural values and features according to their community efficiently in a straight line" (Oğuzkan & Oral, 1993:2).

Preschool education plays an important role in a child's life, from birth, began his days of basic formation for physical, motor, social, emotional, mental and language development, thereby defining the process of education as the way where a large portion of human development is completed (Mutlu, B., Ergişi, A., Bütün, A. & Aral, N., 2012:4).

Preschool children, families and communities have many benefits in terms of social coverage. During the corresponding period of 0-6 years early childhood is the period when children develop faster. One third of evolution and brain function is completed between 0-4 years. The early childhood experiences are crucial to brain functioning. Studies have shown in preschoolers higher rates of academic success due to schooling. Preschool education supports social and emotional development, enables people in adulthood increase their potential to be more productive and efficient. In terms of research has been shown, taking into account individual differences and characteristics, relevant development in preschool children involved in the program of preschool education compared with other children in high school, a higher rate of physical, emotional , language development and creative side of children, characteristics that have been the basis for a positive personality, providing parents confidence in the quality of education being known that educators are actively doing their work, looking for mental, social, emotional, verbal and physical development. (T.C. Milli Eğitim Bakanlığı, 2015)

3.1.2. Brief History Of Preschool Education

Schools for young children first appeared in the 18th century in France and in the UK and Italy in the 19th century; however, these schools were not very different from the other schools that educate children of school age. In these schools emphasis on religious education, teaching chores and household alphabet was given. Robert Owen a social reformer, for the first time had the idea of opening schools for children in the UK. The first school opened in 1816 in the city of New Lanark in Scotland, in order to provide a healthy environment for children, entertaining activities were offered. The German educator Friedrich Froebel in 1841 was the first to establish kindergarten, which means "garden"(Gutek, G.L., 2004).

"Early childhood" is a period of critical and basic growth of an individual in which a child's personality is built. Unfortunately basic education for children at age of seven are at a stage too late to start preschool education as an important part of development was completed. Education is a lifelong process that begins at birth. The foundations of lifelong learning are developed in the first six years age, or early childhood. During this period, it plays a very important role on supporting the social development, to give children a good

education and be available promoting environmental conditions for their physical, mental and emotional development. The early childhood education begins in the family. After the family, institutions of preschool education of children family support in preparation for social life. Preschool institutions contribute to child care duties, supporting working parents; by forming physical, social and healthier children through the emotional and physical development, preparing them for future jobs training, to grow as a social individual. UNICEF qualifies to the institutions of preschool education as "the best start in life", being vital for children, providing equal rights for all (Heckman, J., 2007).

3.1.3. Effects Of Learning environments On Children Learning Process

The learning environments of the 21st century are physical environments where the student is a participative being in self-directed and cooperative learning activities, these spaces are created to allow movement and malleability within the learning environment in a way that allow flexibility in learning (Lippman, P., 2010). On the other hand, Herrera (2006: p.2) states that "a learning environment is a physical and psychological environment of regulated interactivity where people converge for educational purposes," which demonstrates the need for an educational environment that promotes learning and, therefore, the integral development of children (Castro, M. & Morales, 2015).

A physical environment both indoor and outdoor affects the behavior of all who interact in it, being children the main users of it, in turn this can improve or interfere with the learning and development of independence in children, since the physical space functions as a "third teacher" along with children and adults (Stonehouse, A., 2011). Space is also visualized as the result of an educational strategy, an instrument that supports the teaching-learning process. The learning environment is represented by a lively, changing and dynamic environment, as children, interests, needs, ages, adults and the environment in which they are immersed change continuously (Colombian Family Welfare Institute, Ministry of Culture of Colombia & Carvajal Foundation, 2014). (Castro, M. & Morales, 2015). In addition, both the environment and the exterior are seen in an active way, the interior environment consist of an aesthetically structured space where the design focuses on creating a social environment, which supports learning, contributes with educators, allows the student to explore and discover for himself according to his interests and

through the practice of theory it shapes students by promoting interactions among them and spaces (Lippman, P., 2010).

Likewise Regio Children and the Domus Academy Research Center (2009: p.24) consider that the environment should allow to experience pleasure by using it, be explored, empathic and able to attract and offer significance to the experiences of people who inhabit it; in addition, they indicate that communication becomes a structure that is ahead of architecture, reason why in the learning environment should be considered to provide spaces for the connections of words and meanings elaborated by the listener, without the need to make everything explicit in an aesthetic level and language. This is reinforced by Hoyuelos (2005b, p. 172), pointing out that communication is "the ability to establish reciprocal listening, communication to others, to the spaces that speak to us, those that are offered to us" (Castro, M. & Morales, 2015).

According to an analysis carried out by Gifford's (2002, p.298) of environmental psychology findings for educational settings, the interior design, scale and form of the learning environment influences the concentration and distraction of the student in the moment of retaining and memorizing the information, the external noise can interfere negatively in the learning process. In addition, it refers to aesthetics as a characteristic of the environment that has a positive effect on the student's comfort, transmission of cultural values, stimulates creativity and develops independence which in the end is reflected in the academic performance of the student.

The reflection of the above mentioned emphasizes the importance of certain physical characteristics that a learning environment should have to promote an environment to which the student wants to return each day and influences on personality development. Therefore it is of utmost importance to consider the following:

- The use of fluorescent lights highlights the elements that make up a particular environment, providing security, comfort and avoid visual fatigue; however it is important to note that the best light to study is sunlight.
- The interior space should have contact with the exterior, through windows and doors with access to patios or gardens that regulate temperature, improve air quality of the classroom and provide natural light to the interior space.

- The amount and organization of furniture and spaces, is very important for classroom performance, related to teaching strategies, as well as educator and student feelings.
- Students need a certain degree of privacy and belonging to the space, because if space is too dense it can cause aggression among students affecting pedagogical goals (Gifford, R. 2002, p.298).

On the other hand, Guardino and Fullerton (2010) show that through the modifications of the classroom environment it is possible to increase academic commitment and interaction among students. A study by La Roque (2008) shows that while the environment is difficult to understand, the academic achievements of students are lower (Muñoz, J., García, R. & López, V. 2016), that is why simplicity and order in the environment should be considered during the design process in order to provide an environment that not only meets student's needs but also supports the educator during educational practice and simplifies the teaching-learning process.

3.1.4. Alternative Teaching Methods

Teachers have unlimited possibilities with regard to the instructional methods they can employ, but still traditional teaching methods are often used, which focus on the teacher and there is little or no student interaction in class, despite being a more direct method, its efficiency is reduced due to the low attention and interest of some students, which impairs learning. Education and technology education must follow time advance, be flexible and adapt to new demands and interests.

Despite the success of traditional teaching methods in the past, current generations have a completely different mindset than past generations, which requires new innovative methodologies that work especially for today's students. Certainly, success and popularity of the methods used in the past make them the basis for the new ones, transferring the advantages of these teaching methods to the new concepts, generating an innovative method.

To understand better this type of evolution in education, it is necessary to know that it is an alternative teaching method, being that one that differs from the conventional educational system and in many schools is the basis of the educational system. In general, alternative education methods are centered on providing students with the tools that allow them to become self-taught, but always under the direction of specialized teachers (Salabert, E. 2017). Its aim is to try to provide an answer to series of doubts, concerns or perceived shortcomings of traditional education systems that are of concern to education experts, parents and society in general. Methodologies in education have a complex nature, including a wide variety of research, approaches, techniques and tools that try to guarantee the learning process in children (Torras Virgili, M.E., 2015).

Although most alternative methods have decades, there are some of them still employed nowadays, among which we can highlight the following:

a. Waldorf Education – based on the work, ideas and contributions of the Austrian philosopher Rudolf Steiner (1861-1925), that have been of much influence in diverse thinkers and artists. Among its features, we can mention that Waldorf schools are associated with the challenges that industrial society supposes, educating for a social life that would achieve these demands; self-governance in children is promoted, is the base of educational practices and same educational theory and methodology, also promotes self-discipline, attention to children is individualized and educational practices are active.

b. Montessori Method – owes its name to the pedagogue Maria Montessori born in Italy (1870-1952). She renewed teaching by developing a method that especially aimed at children in the preschool stage, based on the promotion of initiative and responsiveness of the child through the manipulation of specially designed teaching materials. This educational system proposes variation of work and greatest possible freedom, so that the child learns above all by himself and to the rhythm of his own discoveries. What characterizes the Montessori Method is the development of the children's cognitive system, to have a prepared environment, to classify the sensitive periods and to take into account the role of the adult. In general, Maria

Montessori's contributions are part of the history of pedagogy and higher education formation of teachers, educators and educational psychologists.

c. Reggio Emilia – is a province of Italy that in the 1950s was devastated by World War II, due to it a group of women decided to build a school where their children were not simply welcomed. Years later, the City Council of Reggio Emilia promoted a network of nursery schools for children aged 3 to 6 years. This methodology is based on the evaluation of the research, key to the reflection and the deepening for teachers' practices and the conception of school as an organized space around different environments adapted to children's ages and needs (Torras Virgili, M.E., 2015).

d. Harkness Method – not based on any ideology, but on an element of furniture, the table. Developed by tycoon Edward Harkness, revolves around a table where students sit around and talk about each and every of the subjects. The classroom is seen more as a conversation hall and the role of the teacher is to moderate the conversation and ensure that the conversation does not deviate too much. This method encourages students' communicative skills and respect, among many other skills. However, it is restricted to a limited number of students, which has limited its expansion between education systems (Santos, D. 2014).

In turn new methods have emerged over time focusing on student-centered learning, where the student not only chooses to study but also how and where, according to his needs and interests. These methods make learning more meaningful by engaging and empowering students to create, understand and connect acquired knowledge. Recently education is changing from a traditional perspective towards a student-centered teaching, many of the methods applied today have taken as base some of the methods mentioned above, among these new methods we can mention;

a. Phenomenon Based Learning – This method currently used in Finland, is based on constructivism, in which students are seen as active constructors of their knowledge and information is seen as the result obtained from solving problems from small pieces that make up a whole. The starting point for learning lies in the holistic

phenomena of the real world, starting with observation from different points of view, so that we can study and understand the phenomenon through questions or problems. In the Phenomenon Based Learning method an environment is prepared by the educator, which bears much resemblance to the prepared environment of Maria Montessori. The approach of this method supports the learning by means of the investigation, solution of problems, realization of projects and educational practices that include learned abilities that could be used both outside and inside the classroom (Phenomenal Education website, 2015).

b. Project Based Learning model – PBL it is a project-based teaching method that allows students to develop their knowledge and skills. Students work for long periods investigating, discovering and responding to a complex problem, demand or challenge. PBL method leaves behind the memorization and the traditional exams and allows that through significant projects, the students manage to dominate the contents. Projects are focus on learning goals including the development of skills such as critical thinking, understanding, problem solving, collaboration and self-direction (Buck Institute for Education, 2017)

c. STEM Education – an acronym used for the fields of Science, Technology, Engineering and Mathematics. It is a method that initiate in the United States when in 1957 they are challenged to become leaders in science, technology, engineering and mathematics, until in the 1990s many education councils helped to shape and guide educational practices by forming the STEM curriculum. It is currently the mainstay of educational reform in the United States and is used in other countries around the world. STEM is a curriculum based on educating students in the four disciplines that compose it, using an interdisciplinary and practical approach that applies to the demands of today's world (Marick Group, 2016). STEM education is characterized by tasks that are functional and based on real problems, allowing students to develop their critical thinking through research, discovery and problem solving in a creative way.

d. Multiple Intelligences Theory – MI theory proposed by Dr. Howard Gardner in 1983. Through this concludes that intelligence is not innate and static that

dominates the abilities and capacities of the human being, but intelligence is in different zones of the brain, which are related to each other, working separately or jointly. Gardner points out that there are eight intelligences, verbal-linguistic, logical-mathematical, body-kinesthetic, visual-spatial, musical-rhythmic, interpersonal, intrapersonal, and environmental-naturalist. This method is based on the integral development of the child, i.e. all aspects of physical, cognitive, social, moral, emotional, linguistic, etc. development. The application of this theory allows students to develop didactic strategies that take into account the different forms of acquisition of knowledge that the students have. This theory is the basis of educational systems in many cities in the United States, Latin America, the Philippines, Singapore and Europe, where many schools carry out activities that seek to develop the different intelligences that are nowadays vital for the success of future professionals and citizens (McFarlane, D. A., 2011).

e. Hands On Learning – developed by Russell Kerr in 1999, generated as a response to the many years in which he observed how students struggle with different learning styles limiting the opportunities to develop their potential. This method is based on the construction of relationships between students and the environment, for this purpose the tasks performed are easily achievable and authentic capable of engaging students in learning, in turn provides an environment with real objects in which students feel they belong and have the opportunity to develop their social skills and self-confidence (Hands On Learning, 2017).

After having a general idea of the old methods that are still applied today and the new methods emerging with the evolution of the world and the technology, as part of the study three of them have been selected being these, STEM Education, Multiple Intelligences and Montessori Method, this because these are the methods most areas cover, are flexible in their contents and also are the most applied currently, giving utmost importance to the development of skills needed for a successful professional in the 21st century. Then the selected methods are further described, including their history, principles and the importance of each.

3.2. STEM Education

The term STEM is the acronym for the terms Science, Technology, Engineering and Mathematics. It is a method that initiate in the United States when in 1957 they are challenged to become leaders in science, technology, engineering and mathematics, until in the 1990s many education councils helped to shape and guide educational practices by forming the STEM curriculum. It is currently the mainstay of educational reform in the United States and is used in other countries around the world. STEM is a curriculum based on educating students in the four disciplines that compose it, using an interdisciplinary and practical approach that applies to the demands of today's world.

The National Science Foundation developed the word STEM from 2001 to 2004 as an acronym which stands for science, technology, engineering and mathematics, this being a teaching method that builds knowledge and skills development required to identify problems, collect and analyze data, experience and solve problems, both in professional and daily life. STEM is an integrative approach to curriculum and instruction, a type of integrated education for all types of students that removes the boundaries between subjects by teaching them as one (Morrison & Bartlett, 2009); its importance lies in the fact that it is the basis for the development of the skills necessary for a successful career regardless of the profession students choose. This seeks to improve competitiveness in the technological development of the nation through preparation in these disciplines. Among the benefits for students joining a STEM based program, we can mention:

- Acquire and apply the knowledge and skills of science and math to everyday life,
- Learn the skills of problem solving,
- Develop critical thinking and
- Learn to work collaboratively in groups

The four disciplines that make STEM complement each other. Although they may have particular characteristics, each has a common goal: to solve problems and to help humanity. Such is the case of science, being very important for the development of humanity affecting all aspects of the life of living beings. Meanwhile technology is the application of scientific knowledge that allows designing and creating goods and services to meet the essential needs of humanity. Engineering is the set of scientific knowledge and

techniques applied to the development, implementation and improvement of physical and theoretical structures, for the solution of problems that affect the activity of society. Engineering is an activity that applies and transforms scientific and mathematical knowledge into something practical. Mathematics study the relations and properties among abstract units with geometric figures or symbols and numbers following logical reasoning.

Educators, on the other hand, having control of the learning environment can provide varied activities individually or in small groups, focused on integrating the four academic areas while exposing students to significant situations. For example, at the preschool level, STEM activities are integrated by examining rocks and insects (science), using computers and simple machines (technology), playing with blocks (engineering) and counting figures and detecting patterns (mathematics) developing all kinds of activities to get students' attention and interest in the subjects (El Educador, 2016).

Within the characteristics of STEM, we have the following:

- Uses an integrated curriculum, focused on the principles of science, technology, engineering, and mathematics, in which students learn to apply the information learned to solve a problem creatively.
- It is research-based, students are asked to work together to solve problems by using questions and response techniques through research.
- Incorporates teamwork and promotes the practice of the skills needed for business and industry, these promote confidence and allows them to discover personal skills that they did not know they have.
- It is attractive to students as they enjoy discussing and participating in the classroom to solve a significant problem.
- It is satisfactory, that is, teachers are able to perceive themselves as facilitators of the learning process and not simply as educators.

In general, the aim of STEM education is to introduce creative techniques for problem solving to students. Likewise enhances the learning experience by applying general principles and practices. When properly incorporated, it must inspire creativity, inquisitive thinking, and teamwork (Roberts, A., 2012). The practice of STEM disciplines can instill in students a passion for research and discovery, fostering skills such as

persistence, teamwork and the application of acquired knowledge to new situations (Bailey et al., 2015; Betrus, 2015).

3.2.1. Principles Of STEM Education

STEM as an alternative method has an interdisciplinary approach, offering a set of multiple facets with greater complexities and new areas of knowledge that ensure the integration of the disciplines that compose it. STEM education by itself, can fit anywhere and take countless forms, also can be an influential and entertaining teaching tool for education. As every alternative teaching method, STEM curriculum is based on certain principles that allow success and development of students' skills and abilities.

3.2.1.1.Students' Prior Knowledge

STEM takes as a solid base of learning students' prior knowledge, if this knowledge is robust and accurate, it gives students the opportunity to control it and use it for a meaningful learning (STEM NSW Department of Education, 2017), which allows students to connect new knowledge to the knowledge they already possess. These relationships give meaning to what the students need to learn and this is only possible based on what the student already knows.

The first element that composes learning process is the previous knowledge of the student; therefore the educator must implement strategies that allow connecting the new knowledge to the previous knowledge. Normally the educator plans from the structure of the subject he is going to teach, sequencing the contents and the subjects as if they are of equal difficulty and in any case when the students present difficulties to the learning of the matter, the educator chooses to dedicate more time to the topic or changes the tactic. However, for humans the reality is not an objective reality, but an interpretation that built from the schemes and structures that we already have. Cognitive ability changes with age, but there are schemes and structures that have not undergone any change and it is on them that one should work to achieve meaningful learning. In this sense Ausubel (1986) states "If I had to reduce all educational psychology to a single principle, I would state this: the

most important factor influencing learning is what the student already knows. Find this out and teach yourself accordingly" (García, C.A., 2010).

3.2.1.2.Students Organize Information And Apply New Knowledge

During the teaching-learning process, students make connections between pieces of knowledge, making them able to acquire and apply new information. Through the STEM methodology, students have the opportunity to organize and create the right connections between knowledge and practice (STEM NSW Department of Education, 2017).

STEM disciplines focus on a limited amount of great ideas, knowledge and conceptual practices allowing concepts to be examined and understood in depth. This more than knowing facts, concepts and even more than an isolated deepening of the different disciplines, implies a connection and organization between the previous and the acquired information. The acquisition of a concept or practice not only generates the subjective view that is related to the different disciplines and also provides an idea of how this can be applied. Naturally, each student organizes the information received according to their age and interests, so the number of challenges in class should be limited depending on the level of education of the student and the subject to achieve depth and cohesion in the interdisciplinary learning process (Flanders State of the Art, 2016).

3.2.1.3.Students' Motivation Influence Learning Process

Through STEM education students become autonomous over when, what, and how to learn. Learning turns active, both the educator and the student participate in the learning process. Students actively participate in the learning process; involve the material studied through the development of writing, reading, listening, and reflection activities motivating them to learn and develop their critical thinking, interpersonal skills and to acquire a better retention of acquired knowledge (Dr. Jean Page, 2016).

However, we must know that each student is motivated for different reasons, an activity done in class produces different responses in students. The term motivation plays a critical role as a guide to the quality of learning that will take place. STEM education by

combining different subjects and integrating them generates a high level of interest and motivation in students (STEM NSW Department of Education, 2017), increasing the student's interest in his or her own learning or the activities that lead to it, this can be acquired or increased depending on interior and exterior elements. It is more important to promote interest in the activity than in the message that one wants to transmit, for which educators must rely on the interests of the students and connect them with the objectives of learning or with the same activity.

3.2.1.4. Development Of Student Skills

Through interdisciplinary teaching, the child develops and learns the skills and knowledge necessary to perform complex tasks, integrating them to develop fluency (STEM NSW Department of Education, 2017). Within STEM education, interdisciplinary teaching involves applying knowledge to more than one discipline simultaneously; students are immersed in the application and integration of science, technology, engineering and mathematics. The student is seen as a whole, in need to learn in an inclusive way, since the learning cannot be segmented, but it is systematically related or organized through a central theme. Seen as a technique of challenging and teaching students to think and solve problems in ways that are meaningful. Invites children to explore and be curious, giving them the freedom to think aloud, develop their own criteria, work in groups and learn to respect the opinions of others (Dr. Jean Page, 2016). In fact, STEM materials are often supplemented by contributions from other disciplines, for example through historical links, works of art, etc.

STEM aims to relate curriculum content to research and design skills. STEM education gives attention to the development and application of design skills, including brainstorming, research and design, testing and improvement. With this aim in mind, teachers facilitate the development of these skills and perform activities that allow students to apply them in a functional way. In the same way, the learning environment stimulates exploration and experimentation, motivating students to increase the degree of self-direction, allowing them to construct or reconstruct the concepts themselves (Flanders State of the Art, 2016).

Currently interdisciplinary teaching has become a need due to the continuous development of scientific knowledge, technological innovation and continuous demand of trained professionals to provide solutions to different kinds of problems capable of developing in a world that is increasingly complex and interconnected. In short, teaching from an interdisciplinary approach requires teaching materials adaptable to the different subjects and a permanent teaching update, which allows teachers to develop didactic skills and acquisition of disciplinary knowledge to successfully deliver this type of teaching and in turn meet the needs of all students equally.

3.2.1.5.Goal-Directed Practice

STEM gives students the opportunity to participate in planned activities that involve objectives and contents of specific subjects, challenging them and obtaining as a result the reactions and comments of their peers, teachers and in turn a self-assessment of their proposed solutions, (STEM NSW Department Of Education, 2017) this in order to improve student work, to emphasize progress rather than deficiency, to enrich evaluation and to stimulate self-confidence, which is the basis of the motivation necessary for effective learning.

The role of children is active participation, that is, solve problems, make comparisons, make decisions, think about consequences, make connections and evaluate outcomes by developing critical thinking skills. The role of children is active participation, that is, solve problems, make comparisons, make decisions, think about consequences, make connections and evaluate outcomes by developing critical thinking skills. Although many educators support incidental learning, in which children have the opportunity to explore, discover, and learn for themselves and other educators prefer intentional instruction, which is more focused and directed by the educator, it is important to balance both types of learning within the classroom (Dr. Jean Page, 2016). The important thing is to consider the specific needs of the child, the acquisition of concepts, skills and abilities used in current and future workplaces.

3.2.1.6.Self-Directed Learning

STEM engages students in group activities that motivate them to take responsibility for the planning, evaluation, monitoring, and reflection of these. While students become more active, they are able to learn for themselves, learn to self-directing, to monitor their activities and to direct their concentration towards learning (STEM NSW Department of Education, 2017). Self-education requires the application of all abilities to different possibilities, the use of all their forces and the use of freedom; in turn encourages creativity through the activities carried out and helps them to have a broader knowledge of topics that they did not know previously. Educators have an important role in the children lives, being responsible for creating an environment conducive to the development of children, providing the material and information necessary to achieve a successful teaching-learning process.

3.2.2. Design Recommendations For STEM Facilities

The recommendations presented below are based on a research done by a team of "Gensler" education experts and educators at "Dwight-Englewood School" in New Jersey, it consisted of visiting 16 STEM science and technology facilities built over the past 15 years. Following the observations made, the result was a catalog of recommendations about general facility design, configuration and specific aspects of the learning environments, highlighting existing opportunities to improve STEM facilities and education through innovative design. After analyzing the study, significant recommendations for a design that fits STEM education are described in the next section.

a. Everything Is Connected

It refers to the STEM disciplines intertwined as an integral part of creating spaces that promote communication and connection between different fields of study. The connections created between the disciplines motivate the students to make the connections between the subjects by themselves, promoting the interaction between the educator and the student.

Figure 1. The Lower School STEM Lab.

Reference: Wilmington Friends Lower School, 2017. https://www.smore.com/346c-wilmington-friends-lower-school

Therefore, it is sought to create spaces that foster interdisciplinary communication, to increase interaction between students and school staff. This can be achieved by creating large areas that promote circulation and movement as an opportunity to provide space and furniture solutions where collaboration and interaction between students and educators takes place; likewise the proximity between the different areas promote the visual connection and integration of them. It is also suggested to create a central space where all parts of the student's life interact and this should be placed at an important intersection between the different ways.

b. Anytime Is a Teaching Moment

The learning process can take place not only in the classroom. When implementing STEM in the facilities students are involved in the course of the school day through various means that integrate into the physical environment the subjects students are learning. The school itself can take an active role as a teaching tool that supports the STEM curriculum through direct and indirect educational tools, from classroom exhibitions to activities that allow the relationship between constructed and natural spaces.

Figure 2. Push and Pull-Kindergarten

Reference: Wilmington Friends Lower School, 2017. https://www.smore.com/346c-wilmington-friends-lower-school

This can be achieved by providing classrooms with transparent walls allowing contact with outdoors. With this, the natural space is incorporated into the classroom and sustainable practices, commitment to the environment and sustainability are promoted, as well as the transparent walls allow the exhibition of the works done and the process behind them. Due to the fact that works are visibly exposed, a learning culture is fostered by actively integrating spaces into the learning of students.

c. Learning Happens Through Doing

STEM education fosters an active and practical approach to learning and teaching, involving students and conveying complex concepts, which imply more practice and experimentation. Spaces that adapt to different needs and promote active engagement with the learning environment are crucial to successful and productive learning. It is therefore suggested to provide flexible multi-zone teaching spaces that promote direct interaction, as well as opportunities for experimentation, and have the capacity to change over time. A fusion of learning environments fosters individual and group work and integrated spaces promote collaborative learning.

Figure 3. Students think both independently and cooperatively

Reference: Wilmington Friends Lower School, 2017. https://www.smore.com/346c-wilmington-friends-lower-school

It should be considered environments that include fixed infrastructure, such as laboratories, workshops, among others, so as to integrate them with more flexible teaching areas, avoiding the creation of isolated spaces and combining different disciplines in a single environment. This in turn creates opportunities for continuous transitions between doing and teaching, supported by the constant evolution of furniture, tools, and technology, so that the ability to evolve easily from these spaces is of prime importance.

Figure 4. Technologic tools used in a STEM classroom

Reference: Middle Country Central School District, 2017.
http://mymiddlecountryschools.net/kindergarten

3.2.3. Importance Of STEM Education In The 21st Century

Today preparing students for a successful future involves exposing them to the disciplines that make STEM education to develop their skills of critical and solving new problems in a world thought in which education is under pressure to respond the demands of a world that is constantly changing. Even if a student who is being educated under STEM does not choose a career related to the subjects that make up this education, the skills learned could be applied in any career, teaching them to think critically, solve problems using their creativity and prepares them to work in various fields.

As Stephen DeAngelis, President of Enterra Solutions said (2016:10), "Educating students in STEM subjects (if taught correctly) prepares students for life, regardless the profession they choose to pursue. These courses teach students how to think critically and how to solve problems, skills that can be used throughout life to help them through difficult times and take advantage of opportunities whenever they arise" (Mab Java, C.)

Therefore, the importance of STEM education in the 21st century is the methodology applied to teach the subjects that compose it, students are not only taught the subject but also how to learn, how to ask questions, how to experiment and how to create. STEM ensures that the essential concepts of science, mathematics, technology and engineering are understood and applied in an interdisciplinary way. Demonstrating that is

founded on great principles and ideas applicable from various angles (Flanders State of the Art, 2016).

STEM focuses on innovation, responding to current challenges and looking for innovative and creative solutions through the connection of STEM components. Likewise, it goes from the current educational standard to an integral interdisciplinary method that develops the skills necessary for successful professionals in the 21st century, becoming increasingly important in a world where there are constantly more challenges and opportunities (Universidad de San Diego, 2017).

This thought is reinforced by Naveen Jain, Entrepreneur and Founder of the Institute for Innovation in Schools Out for summer: Rethinking Education for the 21st Century, "If today's children and students are our future, this is the kind of education we need. This standardized learning system that teaches a test is exactly the kind of education our children do not need in this challenging, pervasive, and confusing world. Today's educational system does not focus sufficiently on teaching children to solve real-world problems and is not interdisciplinary or collaborative enough in its approach" (Universidad de San Diego, 2017).

To conclude the competencies developed through STEM education are essential in the 21st century, as more attention is given to research-based learning, to the relationships built between knowledge and practice, to the development of skills for the resolution of problems either individually or cooperatively and to creative thinking.

3.3. Multiple Intelligence Theory

Traditionally many of the learning contexts are employed by educators teaching all students as if they are all the same. One of the most significant advances in education in the twentieth century is a study of different learning styles, recognizing that each student has different abilities, skills and ways of learning than the rest, this study done by Gardner shows that Cognitive ability is pluralistic rather than unitary, it gives the different types of learners the opportunity to use their areas of strength for the benefit of their learning and allows educators to employ a wide variety of forms for the development of the taught

subject (Arnold J and Fonseca MC, 2004, pp. 119-136). To understand the MI Theory it is necessary to know what intelligence is, defining it as a general ability found in different degrees in all individuals, necessary to solve problems or to elaborate products that are of importance in a cultural context (Gardner, H., 2011).

Howard Gardner defines intelligence in three different forms; as a property of all human beings, an aspect in which humans differ and the method in which humans accomplish a task. On the other hand, social theorist Robert J. Stemberg (1985, 1988, 1997) sees intelligence as a behavior in individuals, which emerges from the balance between three skills or abilities, these being analytical, creative and practical, which together constitute what is human intelligence.

Dr. Howard Gardner established the Multiple Intelligence Theory in 1983; it states that every person possesses different types of intelligence, that is, the capacities that are universal in the human species. Each intelligence actives from certain types of information presented internally or externally and these are usually suitable to collect information through symbolic systems that allow transmission of information in significant ways. His theory debut in his first book, Frames of Mind, where he defines the seven intelligences being these: Linguistic/Verbal, Logical/Mathematical, Spatial, Kinesthetic, Musical, Interpersonal, and Intrapersonal. Later in 1999 Gardner decides to add an eighth intelligence in his book Intelligence Reframed, being this the Naturalistic. Gardner suggests that all individuals have the eight intelligences which may change over time, but each individual develops some more than others according to their abilities and problem-solving skills (Heming A.L. 2008).

The MI Theory differs from the others by taking into account the differences between individuals. Gardner and Hatch (1989) demonstrated that standard intelligence is incapable of exploiting the expansion of human potential (McFarlane, D. A., 2011). The Multiple Intelligence Theory recognizes that people learn using diverse types of intelligences, defining us as human species and differentiates us from other species on earth. The possession of eight intelligences implies that individual learning varies according to a platform of human potentialities and individual differences derived from cultural and bio-psychological factors, which in turn affect the abilities and capacities of

the individual. The theory of multiple intelligences studies the diversity that characterizes individuals, obtaining an effective approach that allows and gives educators the necessary flexibility for the teaching process, taking into account the differences of the students.

> As educators develop and utilize pedagogies that consciously attempt to engage students in a variety of ways, knowing which intelligences students possess is critical to effective instruction. The benefit of this evaluation is two-fold. If instructors know the strengths of their students, they can better prepare engaging and relevant lessons that correlate with those strengths. Secondly, students, knowing their strengths, can engage various strategies to enhance their learning accordingly (Griggs et al, 2009, p. 55).

We live in a global society in which diversity defines what social life is, such as schools reflecting the diversity of social classes, languages, cultures, ethnicities, nationalities, religions, etc., where the educator should be able to facilitate large differences and in turn vary the educational methodology to effectively meet the standards of educational quality.

As an alternative, the MI theory offers to educators working through diverse and flexible educational approaches for this diverse society with different abilities and aptitudes. In the present 21st century, MI is conceived as one of the most effective theories and methodologies for teaching-learning, because students learn in different ways, some are visual learners, while others are kinesthetic and others through a combination of different modes of learning regarding to their intelligence.

MI recognizes the different skills and abilities of children and people in general, which allows schools to expand their curriculum and develop better assessments applicable to the diverse needs expressed by students. It has also provided numerous opportunities for a better understanding of how people learn and how education can be modified based on these to facilitate learning, being considered as an integral part of the teaching-learning process by providing better access to education and satisfying the needs and demands of the educational actors (McFarlane, D. A., 2011).

Howard Gardner (1993:10) points out that the ideal school of the future must be based on two theories: the first is that not everyone has the same interests and skills; and the second is that we do not all learn in the same way. To sum up, he says that we are all

different and we learn in different forms. Gardner claims that we all have multiple intelligences: «We are all so different largely because we all have different combinations of intelligences» (1993:12). That is to say that all human beings have multiple intelligences, which are combined in different ways, which can affect the learning and teaching of the subjects.

3.3.1. Types Of Intelligences

Gardner's theory of multiple intelligences represents an important contribution to cognitive science, describing the development of eight intelligences, taking into account individual differences and the development of each of them in the classroom for the benefit of Education in general. These intelligences are understood as personal weapons that each individual possesses to learn and store the new information so that it can be used when necessary; these in turn can be trained and interchangeable. The different intelligences have a neutral value; none is above the other and are existent in all human beings although some people may be more talented than others (Arnold J. & Fonseca M.C., 2004, pp. 119-136).

3.3.1.1. Linguistic

This intelligence is defined as everything related to language, talks, readings, scriptures and communication (Heming A.L. 2008). It refers to the skill of expressing words efficiently. It includes dexterity in the use of phonetics, composition, semantics and pragmatic uses of language, usually using both hemispheres of the brain (Lupiañez, M. A. 2010).

It is also considered as the intelligence that most people develop due to the continuous communication with others. Students who have a high level of linguistic intelligence usually enjoy writing, reading, speaking in public, performing crossword puzzles, learning languages, and they are very good at expressing and communicating, using language effectively to express themselves rhetorically or poetically (Heming A.L. 2008). This intelligence includes the ability to use language as a means to remember and

memorize information, as well as taking notes helps them to remember the information learned (McFarlane, D. A., 2011).

This type of intelligence can be developed through debates, word games, group readings, etc. This intelligence is mostly seen in lawyers, writers, speakers, journalists and poets (Lupiañez, M. A. 2010).

3.3.1.2. Logical–Mathematical

This type of intelligence has been classified by scientists as the best example of gross intelligence or ability to solve problems that apply to all fields (Gardner, H., 2011). Howard Gardner considers it as the ability to detect patterns, analyze logical problems, perform mathematical operations, reason deductively and think logically. This intelligence is most often associated with scientific and mathematical thinking (McFarlane, D. A., 2011).

It is defined as the ability to use numbers effectively and to reason properly. Corresponds with the thinking mode of the logical hemisphere and with what society has consistently considered as the only intelligence (Lupiañez, M. A., 2010).

This intelligence normally dominates in the fields of science and mathematics, being seen at a higher level in scientists, mathematicians, accountants, engineers and systems analysts among others (Lupiañez, MA, 2010), and involves manipulating objects, solving problems, performing calculations, create hypotheses, complete and solve mathematical operations (Heming A.L. 2008).

Many students with a high level of logical/mathematical intelligence normally work in patterns, enjoy math problems, numerical calculations, statistics, strategy games and experiments, also they are characterized by being very organized, working based on schedules and structures and are not afraid to ask when they do not understand the task to be performed (Heming A.L., 2008). To develop logical-mathematical intelligence we can use tools such as puzzles, activities that involve critical thinking, problem solving, etc.

3.3.1.3. Visual–Spatial

It is defined as the intelligence that involves the skill of perceiving the visual world through the transformation, modification and recreation of the aspects of the real world for an individual. It is considered as the ability to create a model of the world in three dimensions related mainly to the concrete world; however blind people can even possess this type of intelligence, since mental images, spatial reasoning, graphic skills and imagination characterizes it (Heming A.L., 2008). The development of the Visual Intelligence allows perceiving images from outside or inside, in order to reconstruct or modify them, and the taking them to a cosmos making that the objects go all over it and producing or decoding graphic data (Lupiañez, M. A., 2010).

This type of intelligence is highly possessed by people who usually solve their problems using navigation, maps and images that require a great use of them. It is also characteristic of students who enjoy arranging their desks, watching music videos, creating art, making conceptual and mental maps and studying better using graphs, diagrams and pictures (Heming A.L., 2008). For the development of visual-spatial intelligence can be used graphs, diagrams, maps, color signals, etc., enhancing the recognition and use of patterns of space and more confined areas (McFarlane, D. A., 2011).

3.3.1.4. Body-Kinesthetic

The potential of using the whole body or parts of the body to solve problems is what is known as Kinesthetic Intelligence, this is the ability to use mental skills to coordinate body movements (McFarlane, DA, 2011) and implies, according to Gardner, the development and perfection of the physical capacities by the union of the mental and physical activity (Heming A.L., 2008).

Kinesthetic Intelligence is the capacity to use the whole body for expressing thoughts and feelings, through the manipulation of objects and the use of the hands to manipulate elements. It consists of coordination skills, equilibrium, flexibility, dexterity, strength and speed, as well as motor ability and perception of measures and volumes (Lupiañez, M. A., 2010).

The control and evolution of the body movement are of vital importance for humans, since this adaptation extends to the use of utensils, likewise the ability to use the body in the expression of emotions or to create products indicates the cognitive characteristics of body use. This body development is clearly distinct in children as they grow and develop parts of their body through movement (Gardner, H., 2011).

Usually students with a high level of intelligence are characterized by being very restless, have difficulty staying seated for long periods, learn better by observing and are very participative in activities and sports performed outside (Heming A.L. 2008). They also stand out in sports activities, dance, body expression and construction work using various tangible materials (Lupiañez, M.A., 2010). For the development of body/kinesthetic intelligence, the ideal is to perform theatrical games, objects to manipulate, use body language, hands, manual activities, etc.

3.3.1.5. Musical–Rhythmic

Musical intelligence involves the ability to use timbre, rhythm and tone as a skill in performance, composition, and appreciation of musical patterns (Heming A.L. 2008). It includes the ability to perceive, discriminate, transform, compose and express information through musical forms such as musical tones and rhythms (Lupiañez, M. A., 2010). According to Howard Gardner, musical intelligence operates in a quasi-structural parallel with linguistic intelligence (McFarlane, D. A., 2011).

Students who possess a high level of musical intelligence feel captivated by the sounds of nature, melodies and create rhythms to retain information (Lupiañez, MA, 2010), find patterns easily in objects and when they are working are often distracted with Ease with the sound of TV and radio (Heming A.L., 2008). For the development of body/kinesthetic intelligence, the ideal is to perform theatrical games, manipulate objects, use body language, hands, manual activities, etc.

3.3.1.6. Interpersonal

Interpersonal intelligence is built on the ability to distinguish in people the differences in their moods, temperaments, motivations and intentions, allowing us to understand them so as to work with them (Gardner, H., 2011). It includes the ability to interact effectively with people, being aware and sensitive to facial expressions, voice, gestures and postures and the ability to respond to these (Lupiañez, M. A., 2010).

Usually people who possess it have effective verbal and nonverbal communication, the ability to notice peculiarities among others, the ability to hold the attention of several people and in turn understand the intentions, motivations and desires of other people. Students who are characterized by possess this intelligence usually enjoy working in groups, participate in extracurricular activities and enjoy thinking about problems of major importance such as poverty and wars, also they are characterized by being leaders among their peers and being much more communicative than the rest (Heming A.L. 2008).

This type of intelligence is much more developed in educators, salespersons, religious and political leaders, and counselors (McFarlane, D. A., 2011). To develop interpersonal intelligence, it is recommended to promote activities that involve team-work, where the possessors of this intelligence have the opportunity to interact with their peers.

3.3.1.7. Intrapersonal

Intrapersonal intelligence is defined as self-knowledge, understanding the internal aspects of our person, for example multiple emotions, feelings, fears, motivations and the ability to distinguish them in order to understand one's own behavior as such (Heming A.L., 2008). It involves the ability to understand our personality, to build an accurate perception of self, organizing and directing one's life, as well as self-discipline, self-understanding and self-esteem (Lupiañez, M. A., 2010). According to Howard Gardner, intrapersonal intelligence is being aware of our capacities and being able to use that information to control our lives (McFarlane, D. A., 2011)

In general, having the benefits of interpersonal intelligence helps us to work and understand ourselves better (Gardner, H., 2011). Usually what distinguishes adults and children who possess a high level of interpersonal intelligence is their preference for working individually, enjoy helping others, are good counselors, reflect before acting, consider equitable treatment, are aware of their feelings and are considered shy among their peers, yet the control of their nature is extremely high, as they know themselves and understand their personality (Heming A.L. 2008).

3.3.1.8. Naturalistic

Naturalistic intelligence is defined as the ability to understand the natural world, both urban and rural. It is implies the capacity to distinguish, categorize and resort to elements that compose the environment, such as animals, plants and objects, including skills such as observation, experimentation, reflection, questioning and interaction with ecosystem creatures (Lupiañez, M. A., 2010). It includes the ability to distinguish and classify different species of living things such as plants and animals, as well as sensitivity to other characteristics of the natural world, such as global warming, pollution, different cloud formations, among others, developing an ecological consciousness (McFarlane, D. A., 2011).

This intelligence is characteristic of people who are able to distinguish between different types of plants, animals, trees, geography, among others, that is to say everything that is in their ecological environment, usually they appreciate nature, and are very aware of the present and future of the world also they seek to contribute in the care of the same for future generations (Heming A.L., 2008).

Students who possess a high level of intelligence are characterized by loving animals, plants and investigating the characteristics of the natural world, enjoying outdoor activities, classifying objects according to the group to which they belong and are very interested in what reuse and recycling refers (Heming A.L., 2008).

3.3.2.   Principles of Multiple Intelligence Theory

As we have seen before, the different intelligences that human beings possess were systematized using them in the pursuit of excellence. In order to clarify which are the principles developed on each of the mentioned intelligences and that work as base for the creation of the MI theory, these are presented below;

3.3.2.1. Intelligence Is Not Singular: Intelligences Are Multiple

Gardner points out that no intelligence exists by itself in life, that is, it is not singular. Intelligences are always interacting with each other in every activity we do in our daily lives, for example when playing baseball a person needs body-kinesthetic intelligence to run, hit and catch the ball, as well as spatial intelligence to orient themselves in the playing field and to anticipate the directions of the balls and finally the linguistic and interpersonal to communicate effectively some points during any dispute that occurs in the game (Heming A.L., 2008). The MI theory emphasizes the endless ways in which people show their abilities and skills in the use of intelligences as well as the combinations of them (Lupiañez, M. A., 2010). Today we find various problems in the world to have a single solution to solve them, that is why we must make the best possible use of the intelligences we have, recognize that intelligence is not unique but rather the plurality of these and the different ways in which we can manifest and use them.

3.3.2.2. Every Person Is A Unique Blend Of Dynamic Intelligences

For the solution of the different problems presented, we as human beings, we all have a vast amount of adequate capacities to solve them. The intelligences are independent in a significant degree, implying a particularly high level in a specific intelligence; nevertheless, the human beings develop abilities appropriate to solve problems by means of the combination of intelligences. For example, the simple action of playing an instrument requires the combination of kinesthetic and interpersonal intelligence to be able to connect with the audience; in the same way a monitor requires interpersonal, linguistic and logical capacities at the same time. The diversity of human skills is generated through differences in the different profiles. It may even be the case that some individual is not

gifted in any intelligence but the specific combination of skills allows him to fulfill his functions in a unique way (Gardner, H., 2011).

According to MI theory, intelligence could be used as both the content of teaching and the means used to communicate the content. Although sometimes the type of intelligence and the problem do not match, it is duty of the teacher to try to find an alternative way to solve the proposed problem, giving the student a secondary alternative to the solution of the problem, through applying a much more proper intelligence. On several occasions, the secondary alternative does not completely guarantee the resolution of the problem, however good educators usually find the solution for this by using the MI theory (Gardner, H., 2011).

3.3.2.3. Intelligences Vary In Development, Both Within And Among Individuals

While a person may complain about their deficiencies in a specific area and consider it as an unsolvable problem, Howard Gardner suggests that all human beings possess the eight intelligences, some developed to a greater or lesser level, yet we all have the ability to develop each intelligence from a moderate level to an appropriate level of competence if given the appropriate attention, encouragement and instruction and if we take the opportunities presented to us for their development (McFarlane, D. A., 2011).

All intelligences are manifested universally, sometimes at a very basic level regardless of the educational or cultural level that the person possesses. The evolution of every type of intelligence begins with a gross modeling ability, for example the ability to appreciate and distinguish plants or trees in naturalistic intelligence. These abilities appear in general form and the gross intelligence predominates during the first year of life and successively this one develops with the years (Gardner, H., 2011). Being considered intelligent is not based on a set of attributes that one must possess in a particular area, we all tend to develop more intelligences than others, but this does not prevent us from being good in different fields. This means that the Multiple Intelligences Theory give emphasis to the variety of ways that people use to demonstrate their abilities according to the development of each type of intelligence (Lupiañez, M. A., 2010).

3.3.2.4. All Intelligences Are Dynamic

Generally intelligences work together dynamically, as Gardner points out; no intelligence exists by itself in life, intelligences always interact with each other, these are taken out of context, to observe their individual characteristics and learn how to use them in an effective way in our daily work, although should be remembered to put them back to their natural contexts, since by combining these is how we acquire and apply the knowledge (Lupiañez, M. A., 2010).

The Multiple Intelligence Theory holds that children all learn and understand taught material in different ways, which will help teachers to recognize their strengths and weaknesses and to plan according to the diverse abilities in class. Starting from this point, teachers could encourage students to try new ways of understanding the content within the classroom by providing them with different outlets of learning and with opportunities to help students to realize how smart they are (Heming A.L., 2008). Within the class the educator should not only focus on a type of intelligence, knowing that these are dynamic the teacher can present the material used in multiple ways, allowing students to have a better understanding of the main subject.

3.3.2.5. Intelligences Interact With Each Other, Otherwise Nothing Could Be Achieved

As mentioned above, we all possess the eight intelligences in variable degrees that allow us to develop each of them, also they are dynamic by clearly addressing the different aspects of human skills and abilities, but it is the interaction between them that makes up human intelligence. The combination of these elements represents the skills possessed by a human being (McFarlane, D.A., 2011) that allow him to carry out his day-to-day activities.

Naturally, all of the intelligences work in a particular way in each person according to his or her personalities. Most people have some of the intelligences more developed while in others are relatively underdeveloped (Lupiañez, M.A. 2010). This is why it is fundamental the interaction of the intelligences to achieve the objectives and to offer different solutions to the problems presented.

Within the classroom, it is essential the synergy between theories, methods and tools at the center of any sphere of the activity carried out, starting from this we developed a method that allows us to achieve the objectives, and this in turn generates tools to apply the theory and when is applied it could perfect the method. MI allows educators to develop multiple platforms and diverse teaching methods that provide meaningful learning experiences to students and offers different ways of meeting the class purpose (McFarlane, D. A., 2011)

3.3.3. Multiple Intelligences In The Classroom Layout

The Multiple Intelligences theory requires a restructured classroom organization so that it meets all students' needs. As Armstrong (2006, p. 127) argues: "Each intelligence provides a context for formulating some detailed questions about the factors present in the classroom that favor or interfere with learning." Armstrong, besides from exposing all of the above, also defends that there are more physical factors that influence student learning process. He proposes a set of activity centers, considering these as areas in the classroom where each one of the intelligences can be developed, providing a fruitful learning experience for the student. The centers of activities are as follows;

a. Permanent Open-Ended Activity Centers

Permanent areas throughout the academic year, which provide the student with opportunities and experiences related to each of the intelligences, for example the reading center.

Figure 5. Reading center in a bilingual school in Tianjin
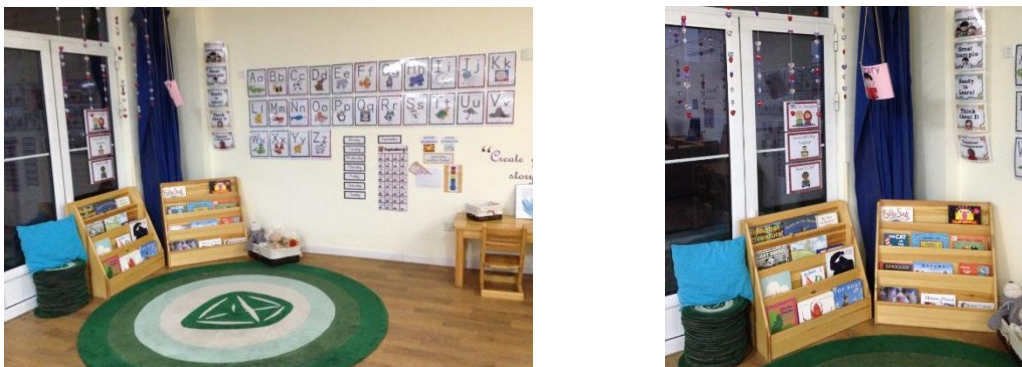
Reference: AIKA. Andreu, M. Diseño de aula e inteligencias múltiples: una experiencia en China, 2017. http://www.aikaeducacion.com/consejos/arquitectura-e-inteligencias-multiples-una-experiencia-

b. Temporary Topic-Specific Activity Centers

These are areas that are aimed at a specific topic. For example if students are studying living things, the teacher would create areas dedicated to this subject and at the same time would develop each of the intelligences.

Figure 6. Temporary space depending on the theme of the month

Reference: AIKA. Andreu, M. Diseño de aula e inteligencias múltiples: una experiencia en China, 2017. http://www.aikaeducacion.com/consejos/arquitectura-e-inteligencias-multiples-una-experiencia-china/

c. Temporary Open-Ended Activity Centers

This type of centers refers to the distribution of areas that can be organized quickly. These are useful for students to be able to comprehend in a visual and easy way the Multiple Intelligences and thus makes available to students different types of experiences.

Figure 7. Music class at the lecture center

Reference: Expat Parent, 2017. http://expat-parent.com/

d. Permanent Topic-Specific (Shifting) Activity Centers

Armstrong refers to these centers as the combination of permanent centers of open-ended and specific activities. That is to say, these are areas in which the material and the resources are fixed, but the composition of the zone changes continuously or according to

the studied subject. For example; when the educator wants to work the seasons of the year during the academic course, this means that the composition of each zone changes according to the station that is working with the students, but the resources and materials of the area are permanent throughout the course (Armstrong, T. 2009).

Figure 8. Art center where diverse intelligences are promoted

Reference: AIKA. Andreu, M. Diseño de aula e inteligencias múltiples: una experiencia en China, 2017. http://www.aikaeducacion.com/consejos/arquitectura-e-inteligencias-multiples-una-experiencia-china/

Creating centers in the classroom allow students to choose the centers of activity they control more, but the most correct is for the teacher to alternate the students in such a way that everyone goes through all the activity centers to develop all the intelligences by providing them with varied opportunities for all children. The educator in turn should consider the different rhythms, abilities, styles of learning and work. Each center should be attractive to the students, be dynamic and motivating, so that student learning process will be more positive and will give them the opportunity to participate in active learning.

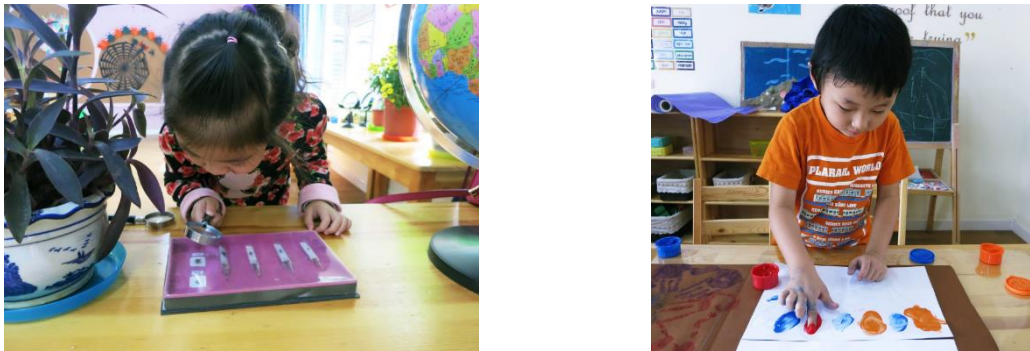**Figure 9. Art center where diverse intelligences are promoted**

Reference: AIKA. Andreu, M. Diseño de aula e inteligencias múltiples: una experiencia en China, 2017. http://www.aikaeducacion.com/consejos/arquitectura-e-inteligencias-multiples-una-experiencia-china/

3.3.4. Importance Of Multiple Intelligence Theory In The 21st Century

The ideas behind this theory have influenced education and its methodologies. The differences between now and earlier periods are evident in respect to how the difference among each other has changed our perspectives and needs, technology and globalization. Today's generations as well as the coming generations require new learning methods, therefore education as a global process today should consider including them for meeting the present and future needs (Silverstein, 1999, p.18). In the present 21st century, individuals are required to adopt the differences of the environment around them, including people, physical environments and nonphysical environments. Each individual develops his/her role and both the classroom and the schools of the 21st century are presented as spaces that reflect diversity of our world, therefore, it is logical the need for a broader conceptual framework for teaching and learning (McFarlane, D. A., 2011).

For this to be possible, the numerous benefits of MI theory should be acknowledged and embraced, as it encompasses the different ways in which we think, teach, and learn. Consequently, Gardner's MI theory considered as the most effective platform for 21st century educational methodologies, meets and exceeds the demands of the actors in the classroom and education (Silverstein, 1999, p.18) and at the same time it offers the opportunity to develop our abilities and skills and for the educational institutions, allows them to recognize and appreciate an extension of human capacities and abilities (McFarlane, D. A., 2011).

The importance of the MI theory is based on the fact that it has been developed as an approach to human cognition that has succeeded to fulfill a large number of educational objectives. The independence and interaction of intelligences offered by this theory allows both society and educators to understand the intelligences and cultural roles required in a society. In the MI, human beings are considered as a group of abilities that have different abilities for solving problems (Gardner, H., 2011).

To conclude, by applying the Multiple Intelligences theory in the classroom, the development of different intelligences is promoted as well as the respect between peers, recognizing that we are all different not only in physical but cognitive terms and in spite of

the problem presented in class, any type of solution proposed by the students will be for full enrichment not only for the participant but also for the partners.

3.4. Montessori

The ideas of pedagogical renewal developed during the course of the twentieth century agreed that education should have a new emphasis and broaden the horizons of the conventional learning program, which was based only on intellectual skills. Among the major educational revolutionaries in recent times, such as Dalton, Froebel, Pestalozzi and Malaguzzi, Montessori is the method that best sums up the ideals of the new pedagogy, and also the one that has a closer relationship with architectural space (Masias C.R, 2012). In this method, there is a need of changing the shape of the space, the idea of one way transmission lessons to a more interactive and dynamic learning. The knowledge is acquired as a result of interaction with the environment and the manipulation of Montessori material within the lesson plan.

3.4.1. Montessori Method

The Montessori Method began in Italy in 1907 and it is considered both a philosophy and a teaching method. It belongs to the pedagogical movement Progressive Education, a movement that appeared at the end of the 19th century but was consolidated in the initial years of the 20th century. Maria Montessori created the Montessori Method, she based her method on the child's work and cooperation among them and adults, where child must be in continuous learning and personal development (Montessori, M., 2004).

The work done by Maria Montessori in San Lorenzo demonstrated to be successful. She was a true proponent of New Education as an international movement, since she argued reformation as process of remodeling and renewing life rather than a mechanical process. The central idea behind Montessori's educational work was to provide children with an adequate environment for living and learning. Her educational program gave equal emphasis to internal and external development, organized to complement each other.

The education process was introduced by Montessori including standardized didactic materials, so that objects collected by children were experienced in detail, permitting the process of abstraction to take place. She also highlighted the process of comparison and abstraction, which is important for intellectual development, in a controlled and intelligently planned way, to prevent this will be left to chance. Montessori was aware of the fact that it is essential to consider the interests and feelings of the children as the starting-point if the aim is a conflict free educational process. Nevertheless she recognized that these interests and feelings shall be stimulated and developed by means of exercises, so that the accomplishment of these exercises will awake a feeling of responsibility in the children. In general her original contribution was the consideration she gave to children's interests and feelings, but also stimulates in children the responsibility and self-discipline (Röhrs, H., 1994).

3.4.2. Principles Of The Montessori Method

The Montessori Method supports the natural development of children in a well-prepared environment, providing children with opportunities and tools for their development. In order to achieve this five basic principles fairly and accurately represent how Montessori constitutes a powerful method for helping children learn to the fullest. The origination of these five principles comes from Montessori's observations of each child having his or her own pattern of development, an intense motivation towards self-actualization, desire to develop his/her potential and by understanding each child needs while creating opportunities for them to develop fully as a human being (Morrison, G.S., 2007).

3.4.2.1. Respect For The Child

This principle is considered the foundation upon which all other Montessori Principles rest. As Maria Montessori said, "As a rule, however, we do not respect children. We try to force them to follow us without regard to their special needs. We are overbearing with them, and above all, rude; and then we expect them to be submissive and well-behaved, knowing all the time how strong is their instinct of imitation and how touching their faith in and admiration of us. They will imitate us in any case. Let us treat them,

therefore, with all the kindness which we would wish to help to develop in them" (Montessori, 1965). Moreover, teacher plays an important role in children's development, as they help them to do things and learn for themselves. Therefore if we want them to be well-behaved we should treat them with all due respect they deserve. Overall, when children have choices they are able to develop skills necessary for effective learning autonomy and positive self-esteem.

3.4.2.2. Self-Directed Learning

Montessori considered that social activity is a fundamental part of the early age, since self-determination is oriented through contact with others, allowing the individual to reach excellence as a social being. The idea of children being able to educate themselves was named by Montessori as auto-education (known as self-education). Children who have freedom of choice and can actively participate in a prepared environment are self-educated. Nevertheless, as mentioned before Montessori teachers play an important role in preparing classrooms for children to self-educate (Morrison, G.S., 2007).

3.4.2.3. Absorbent Mind

Montessori considered that children educate themselves: "It may be said that we acquire knowledge by using our minds; but the child absorbs knowledge directly into his psychic life. Simply by continuing to live, the child learns to speak his native tongue" (Montessori, 1996:20), being this the concept of the absorbent mind. One of Montessori's goals was for us to understand that children are thinking beings, they do not stop learning. Children are born to learn, and they are remarkable learning systems that learn by simply seeing what surrounds them. This learning process is due mainly to their teachers, experiences and environments. That is why early childhood teachers agree with the idea that children are born learning and with constant preparation and ability to absorb knowledge (Morrison, G.S., 2007).

3.4.2.4. Sensitive Periods

During the first age the infant experiences what is known as the sensitive period, a key opportunity to foster positive development. Montessori considers that there are stages when children are more susceptible to certain behaviors and develop specific skills that allow them to learn easily " a sensitive period refers to a special sensibility which a creature acquires in its infantile state, while it is still in a process of evolution. It is a transient disposition and limited to the acquisition of a particular trait. Once this trait or characteristic has been acquired, the special sensibility disappears...." (Montessori, 1966).

As it is well known every individual is different, however all children experience the same sensitive periods, although the sequence and time vary for each child. Through careful observation, the teacher must detect the sensitivity periods in her students, to afford an optimal environment that provides students with what is necessary for the development of their skills (Morrison, G.S., 2007).

3.4.3. Prepared Environment And Its Principles

Montessori kept the idea for better learning children should be provided with a prepared environment, that is to say a place where they can do things by themselves. In a prepared environment, learning materials and experiences are available to children in an organized format. Freedom is the fundamental characteristic of the prepared environment, since within this environment children are free to explore materials that appeal to them and consecutively absorb knowledge through them. These prepared environments are the classrooms that Montessori described, places that educators advocate by referring to a system of child-centered education and active learning (Morrison, G.S., 2007).

The prepared environment by Montessori seeks to provide a learning environment where children can act spontaneously, an environment free of physical barriers, that is, rows of desks and chairs, so that children have the freedom to express by themselves, move within it and can create their own work groups based on individual interests (Montessori, 1972: 46).

The principles of the Montessori prepared environment are the followings;

a. Freedom

Maria Montessori believed that a prepared environment should give the child freedom to move, explore and interact socially, so that this will eventually lead to freedom of choice. Since the child is a free being that by following his own instincts and through exploration manages to develop his potential and expand his knowledge of the environment.

b. Structure and order

A Montessori classroom is used as a microcosm of the universe, in which structure and order are reflected as part of the universe, so that the child begins to internalize the order that surrounds him, thus giving meaning to the world in which he lives.

Figure 10. Montessori Classroom

Reference: Sapientia Montessori School, 2017. https://sapientiamontessori.com/

c. Beauty

A Montessori environment should reflect beauty, suggest a simple harmony, reflect peace and tranquility, in order to make students feel attracted to come in and work.

d. Nature and reality

Montessori respected nature, she believe that we should make use of it to inspire children. She recommended to Montessori teachers that children should interact with nature. Here is why the preferred materials within the prepared environment are made of metallic, glazed and wooden materials rather than plastic or artificial materials. Likewise,

furniture should be child-sized, with the intention of allowing the child to handle it by himself without depending on the adult.

Figure 11. Children interact with nature.

Reference: The Montessori School, 2017. https://themontessorischool.us/

Figure 12. Children use child-sized materials

Reference: The Montessori School, 2017. https://themontessorischool.us/

e. Social environment

Through the process of growing children become socially conscious beings and in turn develop a sense of compassion and empathy for others. For this they must have the freedom to interact among them. This social relation is offered by the physical environment and is stimulated with multi-age learning environments.

Figure 13. The Montessori School EE.UU.

Reference: The Montessori School, 2017. https://themontessorischool.us/

f. Intellectual environment

The purpose of the Montessori Prepared Environment is to develop the whole personality of the child, not only his intellect, for that reason the other principles must be considered to fulfill this purpose. A Montessori Prepared Environment guides the child through the five areas of Montessori curriculum (Practical, Sensorial, Language,

Mathematics and Cultural subjects) and satisfies the individual needs of children, giving them the freedom to manipulate sensory materials that move hierarchically from simple to complex and concrete to abstract (Irinyi, M., 2009).

Figure 14. Children have the freedom to manipulate sensory materials

Reference: Sapientia Montessori School, 2017. https://sapientiamontessori.com/
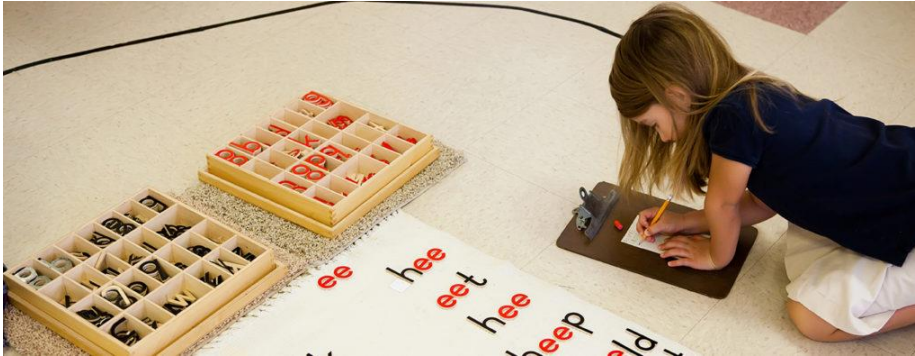
3.4.4. Importance Of Montessori Method In The 21st Century

Nowadays children are prone to day-to-day changes, therefore they need to develop skills that enable them to adapt to these changes and ensure that they are successful in the present digital age. The importance of the Montessori Method is that through a successful method the child is encouraged to develop and master these skills that will be required in a near future. Each Montessori material is designed to work a skill and concept, encouraging the child to organize his critical thinking, solving problems, discovering by himself and absorbing the concept or skill at his own pace. Likewise, multi-age classrooms promote the development of social skills through interactive experiences and cooperative play where grown-up children collaborate with the smaller ones by promoting imitative learning and collaboration among peers. Creativity in Montessori education is fostered through the free environments that are provided to children, in which they have freedom of movement, ability to choose their own work, to understand their world, to self-express and to develop spontaneously always within the limits. Likewise, Montessori materials also reinforce language development as children learn words from the surrounding environment, developing communicative skills.

It is worth mentioning that due to Montessori education the needs of children in development process and the deep respect for children personality, infants are offered the

opportunity to develop naturally, to progress at their own pace, to develop confidence in their ability to understand their environment, to generate a feeling of friendship and respect for others, preparing them for today challenges.

Some of the most important characteristics of this methodology are the observation and orientation by the educators, so that the child develops his/her capacities by himself or herself since the student has an active position in learning. Each of the students chooses how and what to learn, individuality of the students is extremely important according to their rhythms, interests and attitudes towards learning and the constant collaboration family-school for the benefit of the son-student.

However the prepared environment is the aspect that in my opinion can be observed today, and where the biggest difference is with the traditional method. Maria Montessori knew that depending on the environment in which the child is, his/her development would be better or worse, so in her method she speaks of a safe and beautiful environment to facilitate learning and growth.

To summarize the importance of the Montessori Method for education and challenges of the 21st century lies in the benefits offered by the prepared environment, fostering creativity, responsibility, self-discipline and individuality through freedom of choice. Likewise Montessori materials contribute to development of critical thinking and problem solving through experience and practice (Montessori Academy, 2016).

3.5. Main Aspects Of The Alternative Teaching Methods

The new school seeks to make the child a happy human being capable of interacting in society. The classroom is the essential cell of any teaching method and that includes the individual and the community within it. The union of the teaching method and the classroom generates a space of interaction and common learning supervised by the teacher, where every child is provided with the specific tools and opportunities to develop his skills and personality. Within the classroom each student is different, has his own learning process, learning pace, tastes, concerns and interests, at the same time teachers' role as a mediator of the learning process should provide the most suitable environment

that best meets with the principles of the teaching methods, taking into account the variety of students with whom he works and the different personalities and skills he/ would find in a classroom.

The importance of the school and alternative teaching methods in pedagogy is not appreciated, because today the traditional methodology that only gives priority to the lessons, teacher and discipline is still used. This one does not meet the needs of the current and future students. Then it is necessary to know the elements in common among the alternative teaching methods applied nowadays and how the incorporation of these effects on the physical space and benefit in the 21st century. Following a table including the main aspects of each method is presented, as well as a comparison among them in order to synthesize and know how the most important aspects link all of them, and to analyze how every method can contribute to meet the students and teachers' needs in terms of physical space.

Table 2. Characteristics Of The Alternative Teaching Methods

	Alternative Teaching Methods		
	STEM Education	**Multiple Intelligences Theory**	**Montessori Method**
Theory	Developed by the National Science Foundation as an acronym which stands for Science, Technology, Engineering and Mathematics. Method that initiate in the United States when in 1957 they are challenged to become leaders in science, technology, engineering and mathematics, until in the 1990s many education councils helped to shape and guide educational practices by forming the STEM curriculum (STEM NSW Department of Education, 2017).	Dr. Howard Gardner developed the theory of Multiple Intelligences in 1983; it states that each person possesses eight types of intelligence, that is, the capacities that are universal in the human species, recognizing that each student has different abilities, skills and ways of learning than the rest (Heming A.L. 2008).	Method based on the development of the child psychology as it was scientifically studied and observed by Dr. Maria Montessori at the end of the nineteenth century. Supported by her scientific background, she observed the behavior, reactions and needs of children in "House of Children" in Italy (Röhrs, H., 1994).
Aim	To introduce creative techniques for problem solving to students. Likewise enhances the learning experience by applying general principles and practices (Bailey et al., 2015; Betrus, 2015).	The aim of the theory of multiple intelligences is "...to develop a knowledge approach that serves equally to evaluate all activities that have been valued by various societies throughout the history of humanity." (Sternberg, 1992 quoted in Almaguer, 1998, pp. 39).	The aim of Montessori method is the creation of a stimulating environment within each child develops his own method of learning following his innate curiosity and unleashing their potential (Röhrs, H., 1994).
Characteristics	- Uses an integrated curriculum, focused on the principles of science, technology, engineering, and mathematics. - It is research-based, students are asked to solve problems by using questions and response techniques. - STEM is a curriculum based on an interdisciplinary and practical approach that applies to the demands of today's world.	- The possession of eight intelligences implies that individual learning varies according to a platform of human potentialities and individual differences. - Takes into account the differences between individuals. - Understands that people learn using different intelligences, defining us as human species. - Is based on the integral development of the child, i.e. all aspects of physical,	- Provide a prepared environment: arranged, beautiful, and real, where each tool has a purpose for children's development. - Montessori activities are designed for each child to complete them individually according to their learning pace. - Montessori materials are based on children's interests and their growing stage they are going through and with the belief that manipulating concrete objects

	• STEM is an integrative approach to curriculum and instruction, a type of integrated education for all types of students that removes the boundaries between subjects by teaching them as one. • Incorporates teamwork and promotes the practice of the skills needed for business and industry, these promote confidence and allows them to discover personal skills that they did not know they have (Morrison & Bartlett, 2009). • Work in groups teaches children to respect others and to work collaboratively. • It is attractive to students as they enjoy discussing and participating in the classroom to solve a significant problem. • Students acquire and apply the knowledge and skills of science and math to everyday life. • Students learn to develop their skills of problem solving and critical thinking (El Educador, 2016).	cognitive, social, moral, emotional, linguistic, etc. development (McFarlane, D. A., 2011). • Studies the diversity that characterizes individuals, obtaining an effective approach that allows and gives educators the necessary flexibility for the teaching process. • The application of this theory allows students to develop didactic strategies that take into account the different forms of acquisition of knowledge that the students have. • Motivates students in their interests and personalize learning while facilitates attention and diversity in the classroom. • Improve competitiveness in the technological development of the nation through preparation in the four disciplines.	helps the development of knowledge and abstract thinking (Montessori, M., 2004). • The Montessori classroom integrates ages grouped in periods of 3 years, which naturally promotes socialization, respect, solidarity, favor spontaneous cooperation, desire to learn, mutual respect and the acquisition of deep knowledge in the process of teaching others. • Emphasizes the active role of children in their learning and the development of the child's cognitive abilities. • Takes into consideration children's interests and feelings and fosters responsibility and self-discipline. • The child works at his speed to learn and discover his own mistakes through the feedback of the material
Physical Environment Characteristics	a. Everything is connected – connection of different fields of study within the classroom by materials, tools, etc. b. Anytime Is a Teaching Moment – children learn even while they are not in classes. c. Learning Happens Through Doing – students practice and experiment.	a. Permanent Open-Ended Activity Centers b. Temporary Topic-Specific Activity Centers c. Temporary Open-Ended Activity Centers d. Permanent Topic-Specific (Shifting) Activity Centers	The prepared environment principles are as follows a. Freedom b. Structure and order c. Beauty d. Nature and reality e. Social environment f. Intellectual environment

Pedagogic Principles	• Students' prior knowledge. • New knowledge learning and application is influenced by how students organize information. • Students' motivation determines, directs and sustains what they learn. • To develop fluency and automaticity, students must acquire component skills, practice integrating them and know when to apply what they have learned. • Goal-directed practice combined with effective feedback enhances quality of learning. • Students become self-directed learners, they must learn to monitor and adjust their approaches to learning.	• Intelligence is not singular, intelligences are multiple. • Every person is a unique blend of dynamic intelligences. • Intelligences vary in development, both within and among individuals. • All intelligences are dynamic. • Intelligences interact with each other, otherwise nothing could be achieved.	• Respect for the child • Self-directed learning • Absorbent mind • Sensitive periods
Role Of The Student	• The student evaluates constantly his interests, experiences and talents by developing reality-based projects, becoming into an active participant of learning process. • The student uses his knowledge and skills from across the subjects to back up his/her work and understands deeper the concepts. • The student recognize and respect his own and others' different skill sets and intelligences, he learn how to fit into teams according to the role that he has a predisposition to perform well.	• The student presents different learning styles and he selects the techniques that engage the most or all the intelligences he possess (McFarlane, D. A., 2011). • The student perceives information abstractly and processes it, being actively involved in his own learning; he becomes more self-directed and is able to select the most appropriate strategy for particular learning situations (Gardner, H., 2011). • The student understands his own learning profile, developing flexibility and adaptability in their thinking.	• The child is an active participant in his/her own development who uses the physical environment as an important medium for interaction. • The child works for the time he wants in the projects or chosen materials, indicating his own pace or speed to learn and acquire the information presented and in the meantime he discovers his own mistakes through feedback of the material. • The child has a more active and dynamic role in the learning process, where he has the possibility to follow an individual process guided by specialized

Role Of The Student	• The child work in team dynamics helping to solve conflicts and they feel more identified with the group, the fellow students and the school (Dr. Jean Page, 2016).	• The student tackles problems by reflecting his abilities that better fit with the right solutions (Lupiañez, M. A. 2010).	professionals, learning in a dynamic and entertaining way, always from an essential element that is the motivation itself (Masias C.R, 2012).
Importance In The 21st Century	The importance of STEM education in the 21st century is the methodology applied to teach the subjects that compose it, students are not only taught the subject but also how to learn, how to ask questions, how to experiment and how to create. STEM focuses on innovation, responding to current challenges and looking for innovative and creative solutions through the connection of STEM components (Universidad de San Diego, 2017).	The importance of the Multiple Intelligences theory is based on the fact that it has been developed as an approach to human cognition that has succeeded to fulfill a large number of educational objectives. The independence and interaction of intelligences offered by this theory allows both society and educators to understand the intelligences and cultural roles required in a society (Gardner, H., 2011).	The importance of the Montessori Method for education and challenges of the 21st century lies in the benefits offered by the prepared environment, fostering creativity, responsibility, self-discipline and individuality through freedom of choice. Likewise Montessori materials contribute to development of critical thinking and problem solving through experience and practice (Montessori Academy, 2016).

3.5.1. Common Aspects Among The Three Alternative Methods

In the table presented previously a compilation of the most important aspects of the alternative teaching methods is shown. After having done the previous table, for the purpose of fulfilling the objective of the study, the common aspects have been found corresponding to the most important aspects of each of them, these are addressed above,

a. Aim – Corresponding to STEM education, Multiple Intelligences Theory and Montessori Method; a common aspect was found among them, as their aim, in general, seeks to develop a learning that contributes to the educational experience of students, promoting creativity and curiosity in students through different problem-solving activities and the use of different techniques.

b. Characteristics – despite the difference of periods when these methods were created, some of the common characteristics are the followings

- The three methods use an integrated curriculum, on one hand STEM focuses on four disciplines, Multiple Intelligences in eight different intelligences and Montessori in four pedagogical principles. Despite the different bases of these methods, they have in common the development of the child as an individual, taking into account the different capacities, intelligences, feelings and characteristics that constitute the personality of each child, this in order to offer them with an education that meets their needs and provide an effective learning.

- Student motivation is fundamental to the learning process in all three methods. This determines, directs and sustains what they are taught while gaining greater autonomy over what, when and how it is learned. Students actively participate in the teaching-learning process, as both the educator and the student participate in the learning process.

- Moreover, the three methods emphasize the active role of children in learning, participating in all the activities that emerge in the classroom promoting their autonomy, interest in the environment and development of their personality. In turn, it allows the child to decide what and how to learn, acquiring independence, self-discipline, and respect for himself and others.

- The kind of learning that takes place in the three methods is student-centered, respecting their autonomy, interests, natural tendencies and each student receives a personal, direct and personalized attention adapted to his skills and interests in order to improve the skills of each child.

- With STEM, Multiple Intelligences and Montessori students are more likely to engage in learning and to have a community of learners where everyone is respected for their learning skills.

- Due to the diversity, innovation and creativity implicit in each of the methods, it is attractive and motivating for the student, managing to capture their attention through physical and technological tools.

c. Pedagogic Principles – even though they are not under the same name, and their principles differ from each other, some common aspects were found among their pedagogical principles, such as

- The three methods are different from the traditional classroom where all children are treated as a whole. In these methodologies, each child is guided through their own natural pathway of development individually and encouraged to be curios and independent, while making sure the child is nurtured.

- STEM, Multiple Intelligences, and Montessori are highly complementary, with their emphasis on the child determining what he learns through hands-on experimentation.

- Learning develops best when students involve in learning focused on a specific goal, implying a certain level of challenge that promotes students' commitment to the activity being carried out. Every practice is evaluated by the educator, feedback is given to students, and information is provided to help students improve and advance in accomplishing the objective.

- They recognize the importance of the participation and involvement of families and the community in activities, workshops, meetings, etc.

- They are methods that focus on student-centered education, understanding him as a person where affective and social factors are as important as cognitive ones and are based on a profound respect for each child's personality.

- The child's mind is seen as flexible and dynamic, able to improve existing skills and develop those that have not been worked enough, recognizing the importance

of the prior knowledge of the student as the basis of the new information that will be acquired.

d. Physical environment characteristics – Some of the common aspects found among the physical environment (classroom) used for the application of these methods are the followings,

- The acquisition of new knowledge and the application of each method are influenced by the physical environment where the connections between learning and the physical materials used for the development of teaching-learning process happen.

- Creativity and imagination are facilitated, through an innovative environment, a free and spontaneous play that enables the child to express himself and develop his potentialities.

- On one side the Montessori classroom is multi-aged, allowing students the opportunity to be an explorer and a mentor. However, STEM and Multiple Intelligence divide children according to their age but through large spaces, and there is coexistence among children of different ages.

- The physical environment is seen as the universe of the child, in which his mind soaks up information from the environment around him, learning about it and applying the new knowledge for his own benefit. It becomes a support for the learner during the learning process.

- The three methods provide freedom within large spaces without any divisions where all teaching materials are freely available for children, while giving them great flexibility to make their own decisions about the type of work to participate and whether to do so collaborative or individual way.

- Although the Montessori Method does not include technology as part of its curriculum and learning environment, it has been seen in several Montessori schools that technology is now being implemented for class development and part of the interior design. On the other hand in the Multiple Intelligences and STEM Education technology has a key role, to offer the student a personalized teaching and in turn the emergence of new technologies forces us to educate children in a different way, which all three methods achieve with their interdisciplinary curriculums. The new technologies allow creative and different enhancement of

the different intelligences, disciplines and principles that constitute each of the alternative teaching methods.

- In order to promote the development of the capacities to think, feel, and initiative in children, the three methodologies awaken in children the awareness of the need to live, care and enjoy in nature. They also promote learning by discovery, putting children in direct contact with the environment.

e. Role of the student – Student's behavior within the classroom is influenced by the physical environment as well as the motivation he or she gets from the lesson, however some similar aspects of children's role are presented as follows,

- The three types of methodologies develop confidence and automaticity in students, it teaches them to be creative, to ask questions rather than memorize answers, think outside the box, feel confident with themselves about taking risks and work on their skills while integrating them into every taught lesson.
- By means of team work, students turn into self-directed learners, learn to control and adapt their approaches to learning, respecting the differences between them and their peers, motivating them to be responsible for planning, evaluating, and developing different activities.
- On a practical level, the three educational methods propose a great diversification of work and the maximum possible freedom, so that the child learns to a great extent by himself and to the rhythm of his own discoveries.
- Children learn to respect the possibilities and limitations of self and others to promote the acquisition of a balanced personality and self-confidence.
- The student uses his own body as a tool for experimentation knowing, valuing and respecting his fine and gross motor possibilities.

After the aforesaid common aspects of each educational method, this allows us to relate three types of alternative teaching methods according to their main characteristics as well as their importance in education nowadays. As is well known, the nature of the physical environment affects the development of children, life experiences, the implementation of teaching methodologies and the acquisition of different disciplines, that is why when understanding space as an environment it is necessary to understand the relationship that takes place between the man and the environment.

Likewise the teaching methods and their relation to the learning environment lies in the correct implementation of these, generally depends on an environment that can adapt to the requirements of the methodologies and provide the facilities, materials and tools necessary for the correct application of these, without overlooking that the common purpose of teaching methods is to provide an interdisciplinary education to students. By analyzing the main characteristics of each method and connecting them in order to obtain the common aspects, it is intended that the result of this could be taken as a basis for the design of an efficient classroom that is flexible and adapts to the implementation of different methodologies, as is well known that with time, education and teaching methods are evolving as well as the needs and interests of students.

Consecutively, in order to better know the potential users of the educational spaces, their needs and their preferences and to establish guidelines for the development of an adequate physical space for the implementation of the alternative teaching methods mentioned previously, a survey has been developed containing a set of standardized questions for teachers of three different institutions where each of the methods is applied, being these located in Ankara, Turkey. This in order to know specific opinions or facts, to learn more about the target audience, to receive feedback on the physical space and establish a better relationship with educators to be more successful in the future when designing a school classroom.

This survey will be distributed personally to each teacher through visits to the institutions, considering the opinion of each of them. The data collected will be retained through a database which will be used later for the development of the last chapter, the conclusions and finally fulfill the objective of the investigation. The main purpose of the survey is to provide information about the alternative teaching methods used today and how the physical space affects the application of them. This will contribute to improving the quality of the physical spaces intended to impart lessons and apply teaching methods.

CHAPTER IV

ANALYSIS OF THE DATA

4.1. Hypothesis

- H1: The distribution of the environment facilitates students' skills and abilities positively.
- H2: Relationship of learning environment with teaching method will differ between respondents' opinion.
- H3: Students' academic performance may be associated with the student-centered environment.
- H4: The influence of the interior design of the learning environment will contribute the application of the teaching methods.

4.2. Method

In this section, the data gathered through the surveys will be analyzed in order to provide factual information that will be useful for the improvement of the research. The study was divided into three phases; the first phase is based on the theoretical framework presented in the first two chapters. This study was carried out to analyze the characteristics of an effective learning environment as well as the principles or recommendations in terms of interior design for learning environments, defined by the three alternative methodologies. These methods were selected for their implementation and current importance; these are STEM Education, Multiple Intelligences and Montessori Method. The second phase consisted of the application of a survey that was distributed in three different educational institutions in Ankara. The preliminary examinations of the sites were completed in late September, 2017; data was collected along with educators' perspective in terms of indoor learning environment design, since they are the ones who manage the space according to the different methodologies applied. Observations on each site occurred over two-three months and as a result of this observational study, photo documentation of each setting was provided. Besides, knowing that the child is a flexible being who is influenced by the environment in which he develops, at the end of the study the third

section presents interior design recommendations for an ideal learning environment for children, able to adapt to each alternative methodology. These recommendations were developed based on the two previously mentioned phases, that is, the results of the surveys, the elements of a learning environment and the recommendations or interior design principles for a classroom according to the alternative teaching methods.

4.2.1. Design And Implementation Of The Survey

Instructors from three kindergartens were asked to rate the level of suitability with the interaction of classroom's physical indoor environmental and alternative teaching method applied, using a scale of 1 to 5, where 1 = Non-suitable, 2 = Less suitable, 3 = Neutral, 4 = Suitable, and 5 = Very suitable. Previous to the development of the survey a test was done and the reliability shows that alpha value is 0.946 which shows that the collected data is reliable and can be used to find the aim of this research (consult appendix 2). The questions developed for this survey are the result of associating the main characteristics that constitute the three alternative teaching methods and the learning environment. The survey was divided into three sections. The first section was composed of four questions aimed at determining general information from the participants, regarding the gender, level of education, work experience and teaching method applied in the current working place of the subjects. The second section was consisted of 5 common variables among the alternative teaching methods and below each of different statements was presented. Each statement evaluates the suitability of the common aspects from a range of 1 to 5, all of this from an objective perspective. The third section consisted of three open ended questions about the perception physical learning environment. The subjects were asked to provide their opinions of the strengths and limitations of the learning environment in terms of interior design, as well as provide their opinion about the effects of learning environment on children' skills development.

The technique of providing two types of questions makes the result more fruitful, on one side the closed questions provide the required answers and keep the analysis easy and on the other side the open ended questions provide answers that have not been suggested, but rather answers that the respondent can give in his/her own words. This type of questions offer qualitative information, allow infinite number of possible answers collecting more details and help to understand how respondents think.

4.2.2. Participants

This study was carried out to evaluate learning environments for children aged 3 to 6, in terms of interior design. Three different kindergartens were selected randomly in the metropolitan city of Ankara, with the purpose of evaluating the application of design principles or recommendations of three alternative teaching methods at the chosen kindergartens. The kindergartens were selected based on the alternative teaching methods they applied, as this are the essential part of the theoretical framework and the basis of the method and evaluation. Each school worked under one of the three selected methods, being these "Minik Devler Anaokulu" – STEM Education, "Maya Çocuk Yıldız" – Multiple Intelligences Theory and "Binbir Çiçek" – Montessori Method. A survey was conducted in this study in order to provide more accurate information, taking into account the opinions of 8 educators of each educational institution, who teach at the 3-6 year old classrooms.

Table 3. Demographic Information

Characteristics	Participants	Percent
Gender		
Female	23	95.8
Male	1	4.2
Total	**24**	**100.0**
Education		
High school	7	29.2
Bachelor	11	45.8
Master	6	25.0
PhD	-	--
Total	**24**	**100.0**
Work Experience		
1-5 years	16	66.7
6-10 years	6	25.0
More than 11 years	2	8.3
Total	**24**	**100.0**
Teaching model applied at the current working place		
STEM Education	8	33.3
Multiple Intelligence	8	33.3
Montessori Method	8	33.3
Total	**24**	**100.0**

Table 3 illustrates that the highest percentage of participants were females 95.8%, while males were 4.2%. In this study the highest percentage of participants hold a Bachelor degree, which is 45.8%; followed by a 29.2% of the participants who hold a High school diploma; whereas lowest percentage of participants holds a Master degree and 0% of the participants was a PhD holder. Majority of participants have 1-5 years' work experience,

which was 66.7%, followed by a 25.0% belonging to participants with 6-10 years' work experience while only 8.3% have more than 11 years' work experience. Equal percentage of participants applied the teaching model at the current working place that is 33.3%.

4.2.3. Environmental Setting

The three kindergartens located in the city of Ankara were used as a research setting for this study. The three kindergartens visited had classrooms for children aged between 3 to 6 and each of them worked under a different alternative method. The learning environment is composed by physical places and cultures in which students learn, that is why as part of the study was observed that the space includes arranged and organized furniture, also the tools are stored in order to have a clear perception of the relationship between physical environment, student development and application of teaching method within the learning environment.

Figure 15. Photographs of the different learning spaces visited during the research

STEM Education	Multiple Intelligence	Montessori Method
Minik Devler Anaokulu	*Maya Çocuk Yıldız*	*Binbir Çiçek*
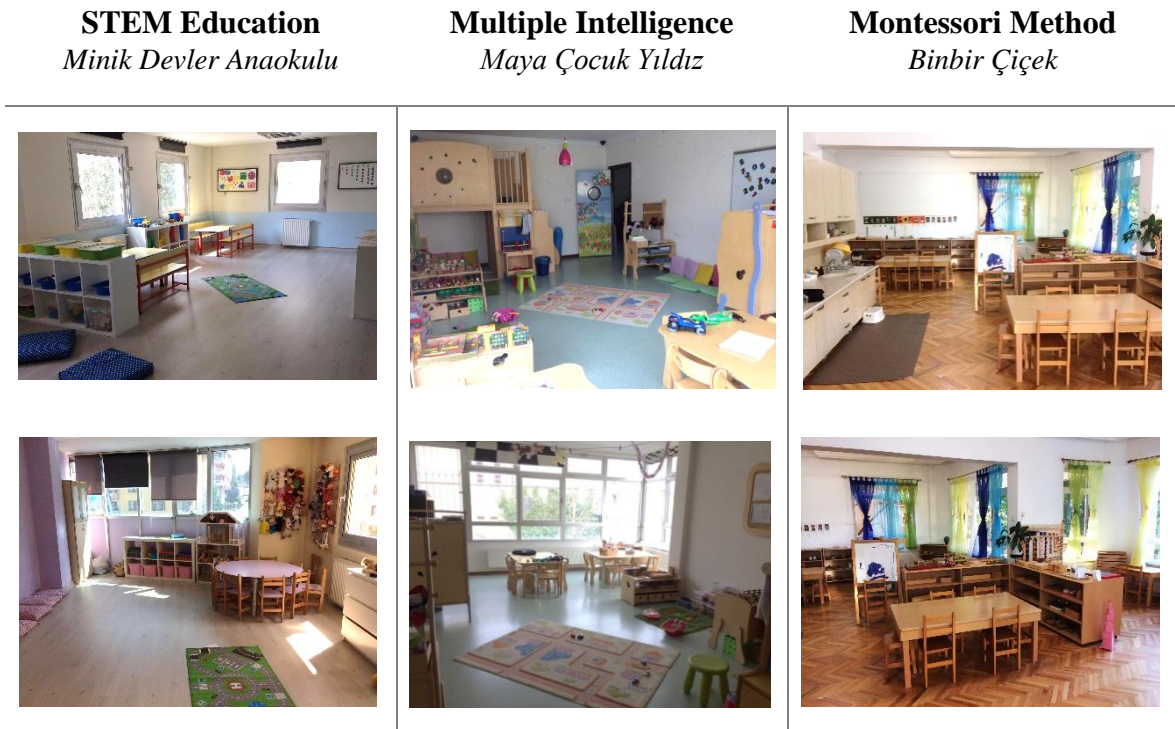
Reference: Pilar Robledo, 2017.

The three institutions used as research setting in this study present the following environmental setting:

- The kindergartens are established in houses of 3 to 4 floors, these have been used for their facilities.

- The classrooms of 3 to 6 years are mainly located between the second and fourth floor, since the ground floor was used for the secretary, direction and reception of the institution.

- All classrooms had openings that allowed the entry of sunlight and ventilation to the classroom.

- The spaces destined to teach different disciplines were organized in a single physical space, which provided the necessary materials and tools for the development of the lesson.

- In all classrooms, the furniture and didactic material corresponded to the natural scale of the child and was in spaces that were reachable for the students.

- The number of students was between 8 to 12 students per classroom.

Figure 16. Photographs of the different materials and tools in the kindergartens

STEM Education *Minik Devler Anaokulu*	**Multiple Intelligence** *Maya Çocuk Yıldız*	**Montessori Method** *Binbir Çiçek*

Figure 16. Pilar Robledo, 2017.

4.2.4. Analysis Of Data

Analysis is distributed in terms of the learning environment design and in accordance with the alternative teaching methods, that is, STEM Education, Multiple Intelligences Theory and Montessori Method. After having administered the survey and collected the data, the obtained responses were transferred to the SPSS software, obtaining descriptive stats. Consequently, at the end of the survey three open-ended questions were analyzed according to their similarities and differences in response to the answers given by educators by performing contextual analysis. In order to give detail view of each variable, the detail discussion of each section is given in the next point.

4.3. Results

In total, 24 questionnaires were distributed and 24 were received back. How the application of the alternative teaching method and the elements within learning environments was divided into five categories with their respective statements; respondents were asked to fill the required information. Following are the answered categories and their results.

Table 4. Evaluate the application of teaching method in the learning environment

Statements	Very Suitable	Suitable	Neutral	Less Suitable	Non-suitable
Frequency (%)					
Educates students in different courses	18 (75,0)	5 (20,8)	1 (4,2)	-	-
Furniture corresponds to model principles	14 (58,3)	6 (25,0)	3 (12,5)	1 (4,2)	
Technological tools match with model principles	8 (33,3)	3 (12,5)	10 (41,7)	1 (4,2)	2 (8,3)
Offers flexibility to fit different lessons	17 (70,8)	5 (20,8)	2 (8,3)	-	-
Provides freedom in activities meeting children's needs	18 (75,0)	5 (20,8)	1 (4,2)	-	-
Facilitates a creative environment and free play	16 (66,7)	5 (20,8)	2 (8,3)	1 (4,2)	-
Allows student to be an active agent in learning process (significant learning)	20 (83,3)	4 (16,7)	-	-	-
Total %	66,07%	19,63%	11,31%	1,8%	1,19%

There were seven statements to measure the application of teaching method in the learning environment. The results are shown in table-4. In response to statement regarding educator response towards the students' education in different courses, it was recorded that majority of educators considered very suitable, which was 75%, while none of the

participants considered it non-suitable. In response to the statement regarding if the furniture corresponds to model principles, it was recorded that 58.33% of educators considered it very suitable, while none of the participants considered it non-suitable. In response to statement regarding if the technological tools match with model principles, it was recorded that majority of educators considered it no very suitable neither non-suitable; which is 41.66%, while 8.33% considered it non-suitable, which mean that half of the respondents considered it either very suitable or suitable. In response to statement regarding to the offering of flexibility to fit different lessons, it was recorded that majority of respondents considered it very suitable that is 70,8% while 8,3% responded as neutral. In response to statement regarding provision of freedom in activities, meeting children's needs, it was recorded that majority of respondents considered it very suitable, that is 75,0%, while only 4.2% considered it neutral. In response to statement regarding if it facilitates a creative environment and free play, it was recorded that majority of respondents considered it very suitable, that is 66.7%, while only 4.2% considered it less suitable. In response to statement regarding if it allows student to be an active agent in learning process, it was recorded that majority of respondents considered it very suitable, that is 83,3%, while 16,7% considered it suitable. In conclusion 66.07% of the participants consider the application of the model in the learning environment very suitable, while only 1.19 % considers the application of the model in the learning environment non-suitable.

It was observed that within the classroom community, children constantly working together while they construct meanings in a dialogical way. The three methods suggest a classroom organization by areas in which different types of activities take place. Within these areas individual and teamwork are supported, meeting the needs and interests of each student. The classroom organization offers flexible areas, facilitating teacher's practice and the application of the teaching method.

Table 5. Evaluate the space implementation in terms of the role of student as an active agent

Statements	Very Suitable	Suitable	Neutral	Less Suitable	Non-suitable
Frequency (%)					
Space empowers students to interact more effectively with themselves	20 (83,3)	3 (12,5)	1 (4,2)	-	-
Space arrangement allows children to choose materials independently	17 (70,8)	4 (16,7)	2 (8,3)	1 (4,2)	
Collaboration and communication within the classroom is encouraged	19 (79,2)	4 (16,7)	1 (4,2)	-	-
Creative and innovative self-teaching materials	15 (62,5)	7 (29,2)	2 (8,3)	-	-
School furniture dimensions match students' anthropometry	20 (83,3)	2 (8,3)	2 (8,3)	-	-
Space fosters self-confidence.	20 (83,3)	3 (12,5)	1 (4,2)	-	-
Space promotes curiosity and interest in the learning environment	12 (50,0)	9 (37,5)	2 (8,3)	1 (4,2)	-
Total %	73,2%	19,06%	6,54%	1,2%	-

There were seven statements to measure the space implementation in terms of the role of student as an active agent. The results are shown in table-5. In response to statement regarding if space empowers students to interact more effectively with themselves, it was recorded that majority of educators considered very suitable, which was 83.3%, while none of the participants considered it non-suitable. In response to the statement regarding if the space arrangement allows children to choose materials independently, it was recorded that 70.8% of educators considered it very suitable, while none of the participants considered it non-suitable. In response to statement regarding collaboration and communication within the classroom is encouraged, it was recorded that majority of educators considered it very suitable, which is 79.2%, while no one considered it non-suitable. In response to statement regarding if the tools are creative and innovative self-teaching materials, it was recorded that majority of respondents considered it very suitable that is 62.5% while 8.3% responded as neutral. In response to statement regarding if school furniture dimensions match students' anthropometry, it was recorded that majority of respondents considered it very suitable, that is 83.3%, while none of the participants considered it non-suitable. In response to statement regarding if space fosters self-confidence, it was recorded that majority of respondents considered it very suitable, that is 83.3%, while none of the participants considered it non-suitable. In response to statement regarding if space promotes curiosity and interest in the learning environment, it was recorded that majority

of respondents considered it very suitable, that is 50.0%, while only 4.2% considered it less suitable. In conclusion 73.2% of the participants consider the application of the model in the learning environment very suitable, while none of the participants consider the space implementation in terms of the role of student as non-suitable.

During the observations completed, the implementation of the educational model contributes to students to become independent while manipulating teaching materials according to their interests and needs. Also by having the class distributed into small areas, self-learning is promoted with corners where different activities can be developed.

Table 6. Evaluate the space implementation in terms of the role of teacher as guide and observer

Statements	Very Suitable	Suitable	Neutral	Less Suitable	Non-suitable
Frequency (%)					
Teachers can interact more effectively with students within the space	20 (83,3)	3 (12,5)	1 (4,2)	-	-
Dimension space allows teacher to guide and observe students from every area	22 (91,7)	2 (8,3)	-	-	
Collaboration and communication within the classroom is encouraged	21 (87,5)	2 (8,3)	1 (4,2)	-	-
Technological tools meet teachers' needs	11 (45,8)	4 (16,7)	6 (25,0)	2 (8,3)	1 (4,2)
School furniture and teaching materials meet teachers' needs	15 (62,5)	5 (20,8)	3 (12,5)	1 (4,2)	-
Space offers opportunities to strengthen the student-teacher relationship	17 (70,8)	4 (16,7)	3 (12,5)	-	-
Total %	73,6%	13,88%	9,73%	2,1%	0,69%

There were six statements to measure the space implementation in terms of the role of teacher as guide and observer. The results are shown in table-6. In response to statement regarding teachers can interact more effectively with students within the space, it was recorded that majority of educators considered very suitable, which was 83.3%, while none of the participants considered it non-suitable. In response to the statement regarding if the dimension of space allows teacher to guide and observe students from every area, it was recorded that 91.7% of educators considered it very suitable, while none of the participants considered it non-suitable. In response to statement regarding collaboration and communication within the classroom is encouraged, it was recorded that majority of educators considered it very suitable, which is 87.5%, while no one considered it non-

suitable. In response to statement regarding if technological tools meet teachers' needs, it was recorded that majority of respondents considered it very suitable that is 45.8% while 4.2% considered it non-suitable. In response to statement regarding if school furniture and teaching materials meet teachers' needs, it was recorded that majority of respondents considered it very suitable, that is 62.5%, while none of the participants considered it non-suitable. In response to statement regarding if space offers opportunities to strengthen the student-teacher relationship, it was recorded that majority of respondents considered it very suitable, that is 70.8%, while none of the participants considered it non-suitable. In conclusion 73.6% of the participants consider the space implementation in terms of the role of teacher as guide and observer very suitable, while only 0.69% of the participants consider it as non-suitable.

The educator within the learning environment is seen as a mediator who offers children with materials necessaries for their learning process. Educators declared great satisfaction regarding the design of the classroom at the results of the study. Likewise they recognized how important is the classroom design in child development by letting them interact with it and at the same time the space offers opportunities to teachers for developing their role.

Table 7. Evaluate furniture and materials in terms of implementation of teaching method

Statements	Very Suitable	Suitable	Neutral	Less Suitable	Non-suitable
Frequency (%)					
Concrete materials (real life)	17 (70,8)	7 (29,2)	-	-	-
Promote self-education	17 (70,8)	7 (29,2)	-	-	-
Aesthetic and creative	15 (62,5)	8 (33,3)	1 (4,2)	-	-
Use of technological tools	8 (33,3)	6 (25,0)	4 (16,7)	2 (8,3)	4 (16,7)
Integrates contents of the subjects	15 (62,5)	6 (25,0)	2 (8,3)	1 (4,2)	-
Arranged according to different disciplines	16 (66,7)	7 (29,2)	1 (4,2)	-	-
Self-correcting materials (puzzles, Legos)	20 (83,3)	3 (12,5)	1 (4,2)	-	-
Fosters involvement of students in learning process	19 (79,2)	2 (8,3)	3 (12,5)	-	-
Total %	66,14%	23,97%	6,25%	1,56%	2,08%

There were eight statements to measure the furniture and materials in terms of implementation of the teaching method. The results are shown in table-7. In response to

statement regarding the concrete materials (real life), it was recorded that majority of educators considered it very suitable, which was 70.8%, while none of the participants considered it non-suitable. In response to the statement regarding if promote self-education, it was recorded that 70.8% of educators considered it very suitable, while none of the participants considered it non-suitable. In response to statement regarding if they are aesthetic and creative, it was recorded that majority of educators considered it very suitable, which is 62.5%, while no one considered it non-suitable. In response to statement regarding the use of technological tools, it was recorded that majority of respondents considered it very suitable that is 33.3% while 16.7% considered it non-suitable. In response to statement regarding if it integrates contents of the subjects, it was recorded that majority of respondents considered it very suitable, that is 62.5%, while none of the participants considered it non-suitable. In response to statement regarding if it is arranged according to different disciplines, it was recorded that majority of respondents considered it very suitable, that is 66.7%, while none of the participants considered it non-suitable. In response to statement regarding if they are self-correcting materials (puzzles, Legos), it was recorded that majority of respondents considered it very suitable, that is 83.3%, while none of the participants considered it non-suitable. In response to the statement fosters involvement of students in learning process, it was recorded that majority of respondents considered it very suitable, that is 79.2%, while none of the participants considered it non-suitable. In conclusion 66.14% of the participants consider the furniture and materials in terms of implementation of the teaching method very suitable, while only 2.08% of the participants consider it as non-suitable.

Regarding the materials and furniture, it was observed that within classrooms movable tables and furniture allow educators to reconfigure the space adjusting it to the teaching method requirements. Likewise, the furniture within the class is child-sized, facilitating children to manipulate them. At observations completed was seen that materials are creative and encourage students to learn. Similarly, the materials that are commonly used are placed in attractive and accessible places to children's hands and visual field.

Table 8. Evaluate the learning environment design according to the teaching method

Statements	Very Suitable	Suitable	Neutral	Less Suitable	Non-suitable
Frequency (%)					
Big and open spaces	17 (70,8)	7 (29,2)	-	-	-
Contact with the exterior (windows, doors)	14 (58,3)	6 (25,0)	2 (8,3)	1 (4,2)	1 (4,2)
Subdivided into thematic areas	16 (66,7)	6 (25,0)	2 (8,3)	-	-
Promotes movement around the space	17 (70,8)	4 (16,7)	3 (12,5)	-	-
Supports use of technology into class development	9 (37,5)	7 (29,2)	3 (12,5)	2 (8,3)	3 (12,5)
Organized, aesthetic and clean	17 (70,8)	6 (25,0)	1 (4,2)	-	-
Promotes children's independence in exploration and the learning process	17 (70,8)	6 (25,0)	1 (4,2)	-	-
Creative environment	16 (66,7)	6 (25,0)	2 (8,3)	-	-
Provides flexible spaces to carry out the projects	17 (70,8)	6 (25,0)	1 (4,2)	-	-
Generates spaces to play and experience	10 (41,7)	9 (37,5)	3 (12,5)	2 (8,3)	-
Total %	62,5%	26,25%	750%	2,08%	1,67%

There were ten statements to measure the learning environment design according to the teaching method. The results are shown in table-8. In response to statement big and open spaces, it was recorded that majority of educators considered it very suitable, which was 70.8%, while none of the participants considered it non-suitable. In response to the statement regarding contact with the exterior (windows, doors), it was recorded that 58.3% of educators considered it very suitable, while 4.2% of the participants considered it non-suitable. In response to statement regarding subdivided into thematic areas, it was recorded that majority of educators considered it very suitable, which is 66.7%, while no one considered it non-suitable. In response to statement regarding promotes movement around the space, it was recorded that majority of respondents considered it very suitable that is 70.8% while none of the participants considered it non-suitable. In response to statement regarding supports use of technology into class development, it was recorded that majority of respondents considered it very suitable, that is 37.5%, while 12.5% of the participants considered it non-suitable. In response to statement organized, aesthetic and clean, it was recorded that majority of respondents considered it very suitable, that is 70.8%, while none of the participants considered it non-suitable. In response to statement regarding promotes children's independence in exploration and the learning process, it was recorded that majority of respondents considered it very suitable, that is 70.8%, while none of the participants considered it non-suitable. In response to the statement creative environment,

it was recorded that majority of respondents considered it very suitable, that is 66.7%, while none of the participants considered it non-suitable. In response to statement regarding provides flexible spaces to carry out the projects, it was recorded that majority of respondents considered it very suitable that is 70.8% while none of the participants considered it non-suitable; and in response to statement regarding generates spaces to play and experience, it was recorded that majority of respondents considered it very suitable, that is 41.7%, while none of the participants considered it non-suitable. In conclusion 62.5% of the participants consider that the learning environment design and its relation with the educational model is very suitable, while only 1.67 % of the participants consider it as non-suitable. The findings indicate that the interior design of a kindergarten classroom affects overall the development of children's skills as well as their motivation towards learning. The majority of the classrooms analyzed incorporate the nine elements of learning environments, opening opportunities for the application of a variety of teaching methods.

After analyzing every statement from a general perspective, following a table is presented with educators' responses regarding their opinion of every statement in terms of the alternative teaching model they apply within it,

Table 9. Educators' perspective in terms of the teaching method applied

Statement	STEM Education	Multiple Intelligence	Montessori Method
	Mean*	Mean*	Mean*
Application of teaching method in the learning environment	4.16	4.71	4.55
Space implementation in terms of the role of student as an active agent	4.39	4.71	4.76
Space implementation in terms of the role of teacher as guide and observer	4.27	4.81	4.64
Furniture and materials in terms of implementation of the teaching method	4.25	4.68	4.57
Learning environment design according to the teaching method	4.27	4.73	4.33

*Statements means ranged from 1 to 5, with higher numbers representing more positive responses.

In the comparison above, the perception of each of the statement differed moderately among the participants of each teaching method. The lowest mean obtained after the analysis is 4.16 and the highest 4.81, which shows that the interaction of the

learning environment with the teaching methods is very suitable, with an overall average of 4.5; and consecutively contradicts hypothesis 4 by demonstrating that the methodologies used for the study have common features. Regarding the statement "expectations and needs in the learning environment", three open-ended questions were suggested in the questionnaire, similarities and differences were determined by comparing and evaluating the answers provided by the participants.

Concerning the question - Could you indicate the strengths of existing learning environments that contribute to teaching method implementation? The general responses obtained through the survey were that the material implemented in the classroom corresponds to the method and is suitable for students' age and development, while also the materials and shelves are reachable for children and enable them to get what they need without needing to ask adults for help since furniture is designed in accordance with student's natural scale. Likewise the indoor environment match with the design criteria contributing to the correct application of the method as this is large enough, creative and entertaining, giving the opportunity to perform different activities and also the classrooms are well connected and they are reachable from every place. Even though these are large spaces, a balance between freedom and leadership to children is offered and also personal space is provided for each student, allowing them to develop and perform the activities of their interest.

In relation to the question - Could you indicate the limitations of existing learning environments in terms of interior architecture? The general responses obtained through the survey were that classes should be on the ground floor so that they can connect easily with outdoors, fostering activities that integrate contact with nature. Also some classrooms don't allow children to move freely within the learning environment and there are not enough materials and games that involve the technological part in the classroom.

And for the last question - Do you think the learning environment design affect overall students' skills development? Why? The general responses obtained through the survey are that well-designed learning environments contribute children's physical and cognitive development while promote learning and make children to think and analyze, also class design contributes to children development because allows children to educate

themselves and learn who they are and what they want. Therefore can be stated from the theoretical hypothesis mentioned earlier about the distribution of the environment and the results of the survey, that the learning environment facilitates students' skills and abilities positively if properly designed. Likewise, equipment, tools and didactic materials help children to develop their creativity and increase levels of student productivity and comfort. A large learning environment allows children to move freely in wide spaces and reach any material of their interest increasing their inner motivation, also it facilitates them to interact with the environment and do whatever they feel like doing. Also the classroom develops all abilities within certain limits although the connection with the outside environment allows a more significant development. Regarding the open questions, was found in this study that only two elements within learning spaces have been left aside of the analyzed elements of a learning environment, being these the combination of digital and physical environment and contact with outdoors. This outcome is product of the completed visits and surveys' results. However, the majority of the elements fulfill educators and teaching methods' expectations. Concluding, at the end of the survey the three teaching methods were assessed based on the responses obtained through the surveys.

Figure 17. Graph with a comparison among the learning space in terms of alternative teaching method application.
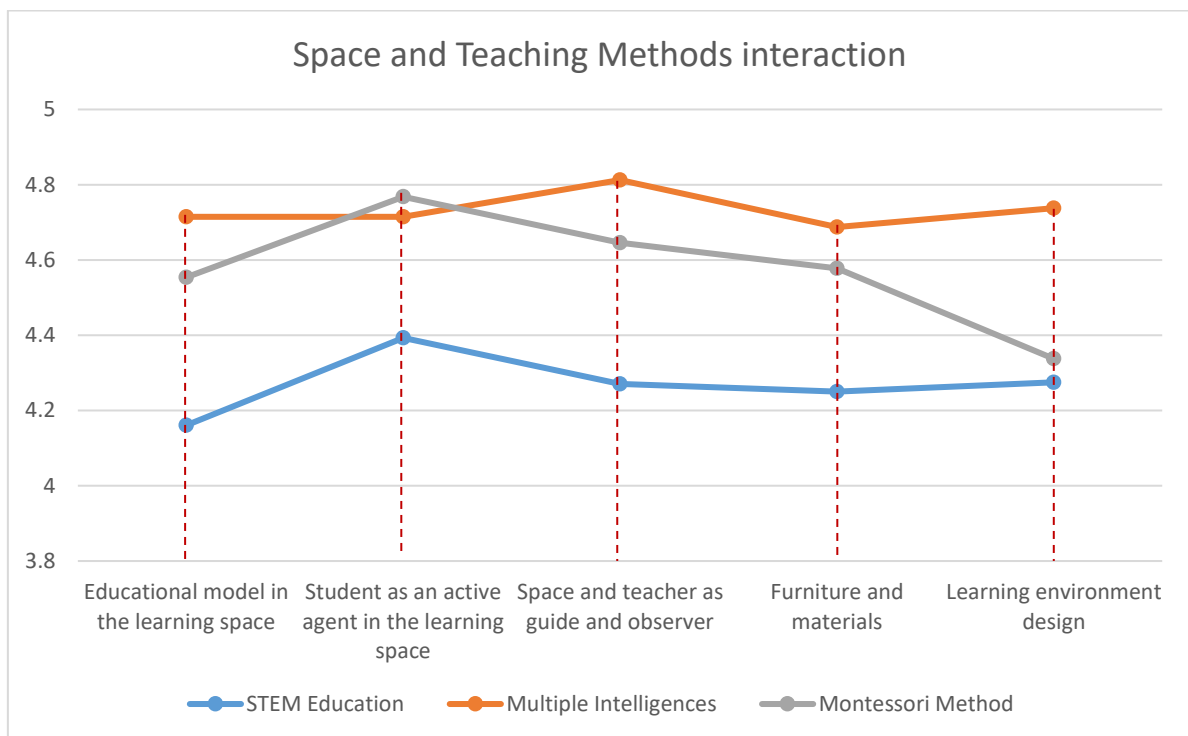
Reference: Pilar Robledo, 2017

The graph represented above shows a comparison of the results obtained after analyzing the data of the surveys. As can be seen in the evaluation of spaces in terms of the application of the alternative method, the results of the evaluations show that the relationship between the variables surveyed has some equality in importance and influence. In terms of the graph analysis, STEM Education with a mean of 4.27 was considered as *Suitable* according to the educators in the kindergarten; on the other hand Multiple Intelligences had a total mean of 4.73, considering it as *Very Suitable* from educators' perspective and Montessori Method with a total mean of 4.58 was considered as *Very Suitable* as well. However, although these three methods are applied at different places, a majority of participants have similar perspectives regarding the application of the method and influence of the physical space. Likewise through this graph the hypothesis 3 is supported, by showing that although every alternative teaching method corresponds to different times, there are more similarities regarding their implementation within a learning environment.

CHAPTER V

DISCUSSION AND CONCLUSIONS

This study has sought to respond to a number of research problems related to the elements within the learning environment and how the application of the teaching method affects the interior design of the classroom. In order to provide all the necessary data two chapters contain the theoretical framework, which was the basis of the development of the study. As part of the theoretical framework, the second chapter incorporates the concept of learning environment, the elements that constitute it and a brief description of the characteristics of the alpha generation, who are the target group of the study, as well as the main users of the classroom. Subsequent the third chapter is composed of an introduction to education, including the concept of it and some of the teaching methods were mentioned, in order to have a general perspective of them. In the same chapter three methods were selected, being these STEM Education, Multiple Intelligence Theory and Montessori Method. These were selected due to their success in preschool education as well as their current implementation in many educational institutions. At the end of the chapter; the common aspects among the three selected methods were found in order to provide a general basis for teachers in respect to how any teaching method can have similarities with any other. The purpose of a fourth chapter is to gather accurate information by gathering data from an administered survey to 24 participants of three different educational institutions in the metropolitan city of Ankara, Turkey. For each teaching method one institution was chosen, these are "Minik Devler Anaokulu" – STEM Education, "Maya Çocuk Yıldız" – Multiple Intelligences Theory and "Binbir Çiçek" – Montessori Method.

There were five items to analyze and three open ended questions. The results are as follows;

In respect to the first item analyzed "Evaluate the application of educational model in the learning environment", 66.07% of the participants consider the application of the model in the learning environment very suitable, while only 1.19 % considers the application of the model in the learning environment non-suitable. According to the second item analyzed "Evaluate the role of student as an active agent in terms of implementation of the educational model", 73.2% of the participants consider the application of the model

in the learning environment very suitable, while none of the participants consider the space implementation in terms of the role of student as non-suitable. Regarding the first item analyzed "Evaluate the role of teacher as guide and observer in terms of implementation of the educational model", 73.6% of the participants consider the space implementation in terms of the role of teacher as guide and observer very suitable, while only 0.69% of the participants consider it as non-suitable. Findings recognize how effective and facilitated the application of the teaching model is when the space contributes with the educator role. Also, when educators are provided with spaces that are easy for them to interact with, the objectives of education are fulfilled. Concerning to the fourth item analyzed "Evaluate the furniture and materials in terms of implementation of the educational model", 66.14% of the participants consider the furniture and materials in terms of implementation of the teaching method very suitable, while only 2.08% of the participants consider it as non-suitable. The findings indicate the importance of the furniture and materials used for the development of the lessons as well as how they contribute to children's skills development and their motivation towards learning. With reference to the fifth item analyzed "Evaluate the learning environment design according to the educational model" 62.5% of the participants consider that the learning environment design and its relation with the educational model is very suitable, while only 1.67 % of the participants consider it as non-suitable. In summary, the answers given by the experts to the three open ended questions supported the criteria that were important in the study of the survey, as well as the clarification of different issues related to the design of the interior of the learning space. The majority of respondents indicate that the learning environment has more strengths than limitations that contribute to the implementation of the educational model. In the same way, educators consider that the learning environment positively affects the development of students' abilities, if this includes places of learning offering possibilities for child development.

After analyzing the data collected, the four hypothesis of the research could be proven. For the first research hypothesis it was noted that, the distribution of the environment facilitates students' skills and abilities positively. This was perceived by providing the interior space of a classroom organized into different areas that provide children opportunities. For the second research hypothesis was reflected that the relationship of learning environment with teaching method differed between respondents'

opinion. Having different study cases contributed to respond this hypothesis, since the respondents interact with environments distributed in different areas within the educational institutions and the methods applied within learning environments are different. For the third research hypothesis it was shown that students' academic performance may be associated with the student-centered environment. If space provides students opportunities according to their skills and diverse interest, students would feel confident to take the control of what they are doing. Therefore their academic performance will improve. For the fourth research hypothesis it was observed that the influence of the interior design of the learning environment contributes the application of the teaching methods. When the classroom offers flexibility to adapt its spaces to the teaching method requirements, the application of it is effective and fulfill its objectives.

The findings from the analysis respond to the study's research problems and help to achieve its aim, which is to provide interior space design characteristics for an effective learning environment design within preschool classrooms, based on three alternative teaching methods. These findings have several significant implications for both evaluating and creating an effective interior design of a learning environment, particularly for the purposes of implementing the elements within learning spaces as well as satisfying children's needs.

The evaluation based on the relations created between the data collected are graphically represented. By relating the common aspects among the teaching methods, the elements within learning environments and the results of the survey the conclusions of this chapter could be developed. This incorporates the concept of the learning environment, the characteristics of an effective learning environment and how it affects the development of the child either on a personal or academic level.

Figure 18. Venn diagram, relation between data gathered for the study
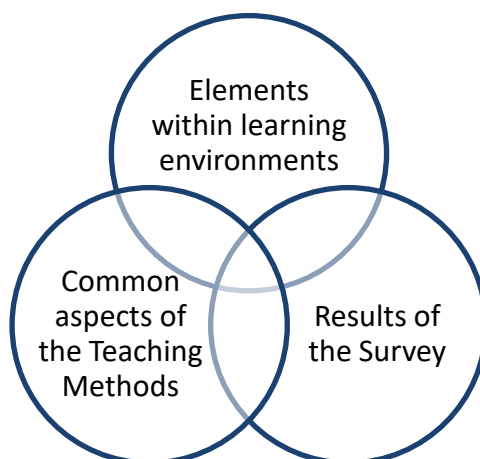
Reference: Pilar Robledo, 2017

Through the aforementioned information, the recommendations for the interior design of a learning space were developed, based on the elements within learning environment. It is important to emphasize that the implementation of the elements mentioned below, contribute for an effective learning environment design, as well as their correct implementation and combination with the teaching methods.

As mentioned in the theoretical framework, one of the cornerstones for the early years of child development is the creation of a learning environment that supports children's learning, socialization, interests and needs while producing the right conditions to improve students' learning, whether mental, physical or cognitively. Therefore, learning environments can be seen as flexible and dynamic scenarios to both time and students' needs, as well as a requirement for schools to create a space that contributes to students' learning, which responds to an educational strategy and constitutes an instrument that supports the learning process. The learning environment is represented by a lively, changing and dynamic environment, as children's interests, needs, ages and the environment in which they are immersed change continuously. The purpose of the learning environment is to encourage children to become protagonists in their own learning, providing them with a stimulating, creative, comfortable and participative environment where they can interact amongst each other and with nature.

This explanation confirms the idea that within a learning environment, all the elements that compose it are of fundamental importance for the application of teaching

methods, students' learning and consequently their success or failure. Certain elements such as space, furniture distribution, aesthetics, materials, tools and facilities that constitute the classroom, support students during the activities carried out within the classroom as well as promote the interaction of these with the surrounding environment and community. The factors and design of the learning environment influence the behaviors, attitudes and motivation of students, determining the quality of the education that students receive and how the application of the teaching methods succeeds. The fundamental spatial relationships are developed between the connections of different areas that are provided within the classroom, thus in order to work and develop skills and abilities in students preschool classrooms should favor spontaneous activities for children. An adequate classroom design allows more interaction between teachers and students and benefits from the spatial distribution to enhance learning experiences, through flexible physical elements.

Mostly environments that stimulate the senses, promote the exchange of information, provide experiences, and propose trial and error activities, feedback and application are likely to support learning. Simultaneously, educators have an essential role in children's skills development, either as mediators or facilitators of learning. Educators are responsible for creating an environment favorable to children's development, creating a proper space organization that allows the development of different didactic experiences in learning as well as offer materials, tools and information necessary to achieve an effective teaching-learning process. However, the most important aspect of the classroom is the design of it, because it provides flexible spaces adaptable to students' needs and to current teaching methods, contributing to improved students' skills and practices in classroom. The interior design of a classroom is adapted to students' needs and also encourages team learning and self-education, that is, students are active agents in their own education, they are protagonists of their own learning, choosing the time and place to accomplish any task.

Thus, it is evident how a learning environment is influenced by different factors that are why this section will discuss the main findings of this study, and how by taking into consideration these factors and the principles of three alternative teaching methods, the classroom as a learning environment and its interaction with the selected methods can be analyzed.

One of the important aspects for which it was decided to work in this context, is because this research seeks to afford enriched information for the new coming educational centers in respect to considerations for an effective and functional learning environment design. These considerations aim to satisfy the needs of a new generation of students, bringing out common aspects between preschool education, teaching methods' principles and elements within learning environments, in order to have a better understanding of how important it is to improve the quality of early education regarding the interior design approach of learning environments. From the results obtained through this research, it can be deduced that within the learning environment there are many elements that influence students' success, the quality of education, the safety of the child and the flexibility of the space. Therefore, it is important for the educational team and designers to take into consideration these elements in the design process, knowing that the correct inclusion of them benefit educational interactions and children's development and learning.

During the visits to three institutions, the implementation of an integrated curriculum was observed, fundamental for the learning process in the three methods; composed of different courses that contribute to student motivation and the educational experience of students. STEM Education, Multiple Intelligence, and Montessori emphasize the active role of children in learning, participating in all activities that emerge in the classroom, guiding each child through his own natural pathway of personal development and encouraging him to be curious and independent. The spatial distribution of the classroom contributes to a personal, direct and personalized attention to each student. Through the visits, it was observed that each classroom provides a favorable environment for children to work without limitations; the distribution of interconnected areas supports interaction among students, offering corners or spaces so students can carry out activities of their own interest or simply interact with the environment while manipulating tools. These spaces are more likely to engage students in learning and not only promote the creation of a community of learners according to their interests where everyone is respected for their learning skills, but also promote creativity and curiosity in students through different problem-solving activities and the use of different techniques.

As some of the main elements within the classroom, it is important to acknowledge the importance of furniture and materials as elements used during the teaching-learning

process. During the completed visits, it was observed that the furniture and tools were made of natural and lasting materials approaching the reality of what is needed to teach, painted with bright colors that easily draw children's attention. Much of the teaching material is fabricated by students in cooperation with the educator; this is renewed within the course of the school year and when changing from one unit to another. The permanent work material is placed in a visual field that favors the student's interaction with it, such as the blackboard, projectors, cabinets, lockers, tables, etc. In the same way the materials are classified according to the units that are required to work, both STEM, Multiple Intelligence and Montessori work under an integrated curriculum, which recognizes the individuality of the student. This was reflected in how the classification of materials with respect to different topics studied in the classroom gives a more objective and realistic sense of the surrounding environment for students, favoring the formation of concrete concepts and giving them the opportunity to analyze and interpret better the subject studied, with the aim of strengthening the different intelligence and variety of interests.

The creativity implicit in each of the methods, was given in an attractive and motivating way for the students, through concrete and technological tools placed in flexible and aesthetic spaces that are connected, so that the student feels motivated to explore and experience the space. However, in some of the classrooms was observed lack of technological tools, which many teachers considered as deficiencies in the design of the classroom. These are essential for the implementation of various methodologies such as Multiple Intelligence and STEM Education where technology has a key role, offering to the student a personalized teaching adapted to the emergence of new technologies; on the other hand, the Montessori Method does not include technology as part of its curriculum and learning environment, however, in several Montessori schools technology is now being implemented in many lessons and as part of the classroom.

Noting that the classrooms are designed focusing on the student, it was observed that the environment is also centered on educators, allowing them to develop their role and to have the facility to move freely within a flexible and comprehensive classroom. It was observed that the teaching materials and technological tools were distributed according to different subjects of study and these were placed within educators reach, so that they could apply the teaching method in a successful way, interacting with their

students and at the same time fulfilling their duties as mediators and facilitators of education. Through a survey the great satisfaction of educators was documented regarding the design of the classroom and how it promotes children's ability to work freely without needing to ask adults for help, encouraging them to be independent and self-directed learners.

The three methods focus on student-centered education, understanding that the construction of knowledge is a shared activity because it is a communicative action and sees the student as a whole. Affective and social factors are as important as cognitive ones, which is why in the classroom the importance of participation and involvement of community in education is recognized. This was observed in the Montessori classroom, for instance, offering multi-aged classrooms, allowing students to interact with kids younger and older than themselves, but also providing them with the opportunity to be an explorer and a mentor. Even though STEM and Multiple Intelligence divide children according to their age, the inclusion of the community was observed, where the difference of every child is accepted and individual needs are satisfied. The physical environment is seen as support for the learner during the learning process and the universe of the child, in which his mind soaks up information from the environment around him, learning about it and applying new knowledge for his own benefit.

On a practical level, the three educational methods propose great diversification of work and the maximum possible freedom, so that the child learns to a great extent by himself and to the rhythm of his own discoveries. The acquisition of new knowledge and the application of each method is influenced by the physical environment where the connections between learning and the physical tools used for the development of teaching-learning process occur. From the observational research to the educational centers and analysis of the surveys, it was observed that the classroom design corresponds to the principles or suggestions for learning environments design according to each methodology and how this contributes to the application of the different methodologies.

For the purpose of developing skills and promoting learning by discovery, the three methodologies seek to put children in direct contact with their environment. Nature

is not only important for the development of children in each of their intellectual, emotional, social and physical aspects, but serves as an ideal space to stimulate their senses and experience while making their own discoveries.

As a result of the observational research, it was noticed that classrooms do not have a direct connection to their exterior, except for windows that receive direct sunlight and allow circulation of natural ventilation. However, when locating the classrooms in seconds and third levels contact with nature turns difficult, making students spend most of their day in indoor environments. Survey results point out that teachers consider important the connection of the indoor environment with nature, because through this the will to learn and to explore is stimulated. The imagination of the student is activated through experimentation and play, their autonomy, creativity, empathy, and motor skills are also encouraged, and they develop coordination, balance, and agility, because practicing outdoor games improves their physical condition. This is why it is considered important to connect the learning environments with nature in child care centers, stimulating the diversity of the educational and play experience in the children, improving their social relations, their academic performance, and their cognitive capacity while supporting their creativity. Basically it is about providing them the possibility of coexisting with an environment based on the senses of touch, balance, movement and life experience.

In conclusion, the teaching methods have many common aspects that facilitate the implementation of these in a learning environment; however it is important to remember that each method has its principles to which we should take into consideration when we consider classroom design. Overall, the importance of alternative methods is that they emphasize the independence and autonomy of students from the beginning because it is evident that students should want to learn in order for education to be successful, which is why the most appropriate tools should be provided to reach this. In general, alternative teaching methods are based on the premise of offering students tools that allow them to become self-taught, although always under the direction of specialized teachers. In addition, they are considered important for the implementation of dynamic methodologies, the construction of new opportunities for personal and professional training. It is through the implementation of these that students are committed to their own personal development

and to their community, are trained; it is about necessarily implying an inclusive dynamic, never excluding in any sense. For the aforementioned reasons, it is considered necessary that future educational institutions and educators take into consideration the interaction between the student, the teaching method, and the learning environment, as it is one of the cornerstones of initial education, in order to form future citizens and professionals able to learn independently and contribute to the development of a better society. However, upon returning to previously mentioned in the theoretical framework, it is recognized that there are certain essential elements that when combined create an exceptional learning environment. Through surveys, analysis of teaching methods and theoretical framework the following was concluded regarding the implementation of the elements within learning environments.

Flexibility

One of the elements of learning environment, is provided by spaces that adapt to the possible emergent changes in either teaching strategies or allocation of furniture. The space should be able to reconfigure and create within it different spaces based on students and teachers' needs. The learning environments of the 21st century are environments where the student is a participative being in self-directed and cooperative learning activities; these allow movement and malleability within the learning environment as well as flexibility in learning process. When finding the common elements of the three teaching methodologies, they integrate the flexibility by seeing as flexible and dynamic the child's mind and by motivating the student to assume an active role in the teaching. That is, the is the one who chooses the time and place to carry out the projects carried out, in the same way that through spatial distribution there are connections between learning and the physical materials used for the development of teaching-learning process, so children can work individually or in groups. Through the visits and interviews conducted, the participants reported that the dimension and distribution of the space allows them to implement their teaching techniques effectively. In the same way, it was observed that the classroom distribution actually facilitates the student's flexibility so that they can move freely within the classroom and use the materials and tools of their interest for their cognitive development. The classrooms are easy to explore, the learning environment promotes social interactions and communication through flexible areas that allow students to choose and place furniture easily. When the classroom is divided into corners or areas

destined for different activities, each work area is well defined, and these provide enough space, furniture, and material necessary for carrying out specific activities. The busiest areas should be clearly separated to avoid crowds that cause feelings of overcrowding; the circulation spaces should be wide and not interrupting the work areas. The arrangement of furniture and areas facilitates the movement of the child inside the classroom, offering a flexible and functional space. Additionally, classrooms have tables that are movable and allow educators to reconfigure the space adapting it to the teaching method applied. This proposal makes it possible to evaluate the spaces and the classroom activities in a more analytical and systematic way, having a positive impact on each of the daily learning situations.

Comfort

It provides a quality space where students feel comfortable to concentrate on the task at hand. Comfort encourages interaction among children by offering comfortable furniture, objects, and materials for educators and students. Comfort in spaces is given by implementing neutral colors, on walls, curtains, ceilings, etc., avoiding anxiety and discomfort for users. Comfort also includes elements that contribute to creating a relaxed environment, such as heating and cooling, comfy chairs, natural light, artificial lighting, and acoustics. By looking at the common aspects of the three methods, comfort is given by offering a space that respects children's autonomy and interests, through spaces that make the student feel comfortable, with materials of their interest that are easy to manipulate, spaces adaptable to their skills and interests making them feel comfortable to develop the tasks carried out. In general, it is very important that the spatial distribution makes the child feel safe, comfortable, in an enjoyable, aesthetic and welcoming environment. After having analyzed the surveys, the participants reported that the physical space gave them the comfort of being able to interact with students and implement methodologies. Likewise through the visits it was observed that children move comfortably throughout the classroom and interact in each of the areas provided when there are colorful and contain interesting materials for them, so classrooms maintain a standard temperature thanks to the heating for winter times and windows for summer seasons. The structure and order are reflected as part of the small universe comprehended within the classroom. The space suggests a simple harmony, reflects comfort, in order to make students feel attracted to come in and work. Within the learning environment collective work areas should be

compatible, creating specific areas for attractive and motivating activities for students. Additionally, classroom design should facilitate children's proximity to the objects and materials they need. Both flexibility and comfort, promote cooperation among students as well as cooperative and self-learning. They also influence the possibilities for movement and, consequently, physical behaviors of childhood in the environment.

Aesthetics

It is presented as one of main elements that should be taken into consideration, because through this we manage to draw students' attention and generally kids need to be motivated to learn. Aesthetics is important so that the student feels motivated to participate in the teaching-learning process. The aesthetic value of the environment not only lies in the colors used in walls or floors but also in the simplicity, order, and cleanliness of the space; including interesting elements to see and touch. The interior environment consist of an aesthetically structured space where the design focuses on creating a social environment and the exterior works as a form of integrating academic disciplines, favoring the academic and social development of children, and promoting the conservation of the natural environment. The decoration of the classroom is simple with creative illustrations that motivate students to learn. An aesthetic space allows contact with the outside world through natural lighting and outwards views, avoids excessive spaces, objects and the use of too many bright colors, since these affect emotional states. On the other hand by using neutral colors the beauty and color of the materials, teaching tools and nature are enhanced. Aesthetics should be provided by including interesting elements to see and touch, allowing kids to have contact with the environment, including flexible materials that allow a variety of uses. As some of the main elements within the classroom, it is worth it to mention the importance of furniture and materials, the design of which should be based on the interests of children, becoming attractive to them, inviting them to explore, and promote their creativity and divergent thinking. At the evaluation of the participants' responses and the outcomes of the completed visits, the simplicity of beauty remains as an essential element which matches with the design of the classroom. It was also observed that the most commonly used materials are not only in attractive places but also in accessible places to children's hands and visual field with big, clear and simple illustrations. Within the classroom, an attractive range of colors is used, unifying subjects without overloading the classroom with decoration. Walls and floors have neutral colors that allow children to

visually identify the spaces where the materials of their interest are located. Likewise, the decoration are placed in their visual range using striking colors for the students. The classroom reflects beauty, suggesting a simple harmony, reflecting peace and tranquility, in order to make students feel attracted to come in and work.

Learner-centered

It is an element that not only includes the design of the space but respects the different capacities, skills, intelligences, feelings and characteristics that constitute the personality of each child; provides them with opportunities for developing their own judgment and knowledge, encouraging them to make decisions by offering large open spaces where children can interact among them. Nowadays students have active roles in the learning process, participating in the decisions taken within the classroom. The child is seen as an individual; therefore, they have the right to feel that they possess the space with which they interact. The classrooms are specially designed to provide a learner-centered type of education, in which the autonomy, interests and natural tendencies of each student are respected. At the same time space encourages students to become active agents in the teaching-learning process. Classroom should teach by itself and provide a learner-centered environment where furniture should be appropriate to students' height and accessible to all. This will encourage students to explore, make decisions and learn through interaction with the environment and its tools. The furniture is child-sized so that children feel comfortable and confident to manipulate materials that they can manage on their own. With respect to the teaching methods, they work under a curriculum that focuses on the development of the student's potentials, abilities, and knowledge. These promote the active role of the student in the learning-teaching process, allowing the child to take control of how and when to learn. The educator is seen as a mediator who provides them with tools and centers his/her educational strategies on the student. During observations and surveys, educators declared that both the methodology and the physical space operates for the child. Through the survey it was stated by the educators that they had great satisfaction regarding the design of the classroom and the handling and distribution of the materials and tools. Educators also stressed the importance of classroom design in child development and how it contributes to their ability to work freely without needing to ask adults for help, encouraging them to be independent and self-directed learners. The materials and furniture are child-sized and these are located in spaces created for students, allowing interaction to

not only expand their knowledge by themselves but with the intervention and direction of the educator as well. Fostering the active role of the student within the classroom was represented by having student-centered spaces with areas or corners where they could perform different activities either individually or in groups. Moreover, spatial distribution of the classrooms contributes personal, direct and personalized attention to each student. Therefore, a good spatial distribution of the classroom should consider how children perceive the world, trying to see things from their perspective, understanding what draws their attention, what stimulates them and what helps them to grow. Spatial distribution should also take into account children's visual field, so that, students turn into self-directed learners, learning to control and adapt their methods to learning, respecting the differences between them and their peers and keeping them motivated to be responsible for planning, evaluating, and developing different activities. Designing an environment centered in the student is achieved by creating large and flexible spaces, where the different sections are interconnected and where the materials and tools are within reach of students and proportional to their size.

Inclusion of community

It has been considered as an essential part of educational institutions in the learning process of the child. Generally, the classroom design seeks to promote the formation of an integral being, the relations of the students with the community and the formation of their identity. Interaction of teachers with the community allows them to collaborate and share their knowledge to improve the skills required in the classroom. Certainly the child is an individual being who conducts himself; however, the interaction with those around him is vital for a meaningful learning. Classrooms and virtual spaces are seen as tools for improving student learning and commitment. They promote communication, key for an effective and successful community. An environment that involves community is flexible; allowing productive learning and participatory work opportunities among children, as they learn from the interaction. Creating a community can be done through work by corners or environments where children work as a team, sharing time and space among themselves and adults, thinking aloud while expressing their desires and sharing their discoveries, doubts, and concerns. When we refer to teaching methods, the importance of community involvement is recognized and the participation and involvement of families and community in educational activities, engaging students in learning and to helping them to

have a community of learners. In relation to the application of an integrated curriculum, students are asked to work together to solve problems, incorporating teamwork and promoting the practice of the skills needed for business and industry. Another way the methods create communities within the classroom is by multi-aged classrooms, in the case of Montessori Method, but also STEM and Multiple Intelligence divide children according to their age but through large spaces, and there is coexistence among children of different ages. Each classroom is a small community that seeks to generate a sense of responsibility within its surroundings and the ones who inhabit them. Through the visits done, it was observed that classrooms are large enough; these are distributed into areas with particular topics, where the children work in groups, exchanging opinions and respecting others'. Strengthening the sense of community within the classroom was represented by providing large spaces with areas for different disciplines, meeting spaces to carry out group activities, where children have the opportunity of coexisting with each other, also placing the furniture in a way that promotes work in pairs or in small groups. The classrooms are side by side, promoting communication between children of different ages and in turn, allowing them to interact with other teachers. Support for the sense of community within the classroom is provided by the arrangement of furniture in different ways when group deliberations are made and by designating corners of the classroom according to the units that are being studied. In these corners, there are murals with work plans, texts, and artifacts for children, books with information, tools and instruments. The classroom is seen as a social reality, a mini-society where dialogue between the child and the adult is promoted and also children learn to respect their personal possibilities and limitations as well as the possibilities and limitations of others to promote the acquisition of a balanced personality and self-confidence. Within the classroom community, children commit themselves to work together and to construct meanings in a dialogical way. In general, most of the teaching methods suggest a classroom organization by areas or corners in which different types of activities take place; however, the way they are used is more significant. When the class is organized by areas, individual and teamwork are promoted, meeting the needs and interests of each student. Organizing the classroom into small areas, the child recognizes the place where he can find the material that he wants, returning it at the end of the activity. All of the aforementioned was observed within the classroom design, meeting the needs of not only teaching methods but children.

Student independence

It is encouraged by creating a creative and participative environment, where children act and think from an active position about their own actions, given with new challenges and chances for them to discover, innovate and think. The space distribution facilitates students' interaction and encourages them to be independent and confident about their decisions. Thus, children should participate in the organization of the spaces to be able to appropriate the environment; after all, they are the main users of the environment. At the same time the distribution of space invites children to move and decide independently the areas and materials with which they want to interact. These spaces are large enough so that they can take control of what they are doing; furniture is arranged in spaces that allow them to manipulate them. Among the common aspects of the teaching methods, the physical environment is seen as the universe of the child, a support for the learner during the learning process, where space offers diversification of work and the maximum possible freedom to children, so that they learn by themselves and to their peace. The three methods provide freedom of movement within the classroom offering large spaces without any divisions where all teaching materials are reachable for children, so that they make their own decisions about the type of work to participate and whether to do so collaboratively or individually. As a further matter, the classroom design provides spaces for different activities in which children have the freedom to participate in projects of their interest, as well as manipulate the teaching materials and the tools they want. The learning environments observed during the visits support the idea of independence by placing materials within the reach of children, in completely free spaces, where children take control of the task they are executing, in the same way during breaks children can continue to use the materials and spaces allocated in the classroom, which gives them a sense of confidence and independence when choosing the activity they want to perform. Likewise, the student has the freedom of choice to interact with the environment and the elements that compose it, and in turn acquire the necessary learning by doing so. The connections created between the disciplines motivate the students to make the relations between the subjects by themselves, promoting the interaction between the educator and the student.

Creativeness

It is considered essential to the success of learning. This element is not only reflected through learning strategies but also the inclusion of new technologies,

collaborative and active learning within the educational spaces. A creative environment promotes contact with nature, implements materials that stimulate creativity, exploration, manipulation and interaction with cultural diversity, and offers furniture that is attractive and engaging for students. By means of the three alternative teaching methods, these promote creativity and imagination through an innovative environment plus, free and spontaneous play that enables the child to express himself and develop his potentialities. The diversity, innovation and creativity implicit in each of the methods are represented in the classrooms where the form, flexibility, and quality of the physical environment is given in an attractive and motivating way for the students, managing to draw their attention through concrete and technological tools placed in flexible and aesthetic spaces that are connected, so that the student feels motivated to explore and experience the space. Looking at the outcomes of the surveys, educators agreed that the environment promotes creativity by working with different types of materials and by providing areas where different types of activities can be developed. Likewise, it was observed that the illustrations and decoration used in the classroom promote the learning of the students by keeping them motivated and interested in the topics studied. Therefore, providing a creative environment is extremely important when the active participation of the student in the education process is desired. It is important for the child to learn to decide what and how to learn, to feel motivated not only by the educator practice but by the physical environment, so that he can acquire independence, self-discipline, and respect for himself and others.

Combination of the digital and physical environment

This has acquired more importance since current students want to connect and communicate constantly and seek for an environment that supports these connections. Besides the educational system cannot ignore the great importance of new technologies if it is sought to achieve an integral development of students since new technologies allow creative and different enhancement of intellectual capacity, disciplines, and principles that constitute each of the alternative teaching methods. Technology enhances the cognitive, affective, behavioral, academic, and social commitment of students, and contributes to a deeper learning. Technology supports teaching methods and the environment by integrating furniture like smart boards, tablets, net books among others; it also facilitates the learning process and promotes interactivity with other teaching methods and technologies. Due to the diversity, innovation, and creativity implicit in the three teaching

methods, the motivation to learn is promoted by the implementation of technological tools in the classroom. Among the common aspects of the three methods, technology is implemented for class development and offers the student personalized teaching with new technologies. Surveys indicated that educators believe the lack of technological tools as part of the educational practice and as an element of the design of the learning environment, limit the development of required skills. However, when visiting the school that works under STEM Education, the integration of smart boards was observed within some classrooms, although the lack of technological tools is evident, limiting the development of the class practice. Therefore, it is important to consider the inclusion of new technologies within the classroom by merging physical and digital infrastructures to effectively support the learning process. As in this world that evolves day by day, both current and future generations need better educational offers, due to society's demands and the constant contact with technology, which is a very powerful communication tool between students and teachers that increases creativity, participation in class and students' motivation.

Contact with outdoor spaces

It is an element within learning environments that is considered elementary for the acquisition of physical and cognitive social skills. Children who participate in outdoor educational activities usually develop a more creative imagination, their immune system is stronger, stress levels are much lower and their concentration increases. An environment connected with outdoors is created by locating transitional spaces between external and internal areas, providing physical and visual contact with nature. However, the contact with nature is promoted in indoor areas by combining furniture and materials made with natural materials. In general, the natural environment promotes participation of children in learning; developing their motor, language and cognitive skills. Regarding the common aspects of the teaching methods, they recognize the importance of outdoor physical activity, strengthening creativity and allowing children to be more sociable and cooperative. In the same way, the direct contact with nature and the world provides knowledge that children can apply in their lifetime. In order to promote the development of capacities to think and feel, as well as initiative in children, the three methodologies awaken in children the awareness of the need to live, care and enjoy in nature. They also promote learning by discovery, putting children in direct contact with the environment.

From the survey's results it could be inferred that the main concern regarding the classroom design is the contact with outdoors. Classrooms are located between the second and fourth floor, which restrict the interaction with nature and in turn, makes the children spend most of their school day indoors. It was observed that all the classrooms have outward views, which afford natural light and ventilation, however, as the educators stated, the exterior becomes a missed place due to a lack of access. Because of this, it is important to consider the connection of interior space to the outside world through natural light and outwards views, not only for stimulating creativity and promoting collaboration, but because both the environment and the exterior are seen in an active way. It is important to remember that the connection of the indoor environment with nature stimulates the will to learn and to explore, activating the imagination of the student, their autonomy, creativity, empathy, and motor skills. Children develop coordination, balance, and agility, because practicing outdoor games improve their physical condition. Therefore the connection of classrooms with nature stimulates the diversity of the educational and play experience in the children, cultivating their social interactions, their academic performance, and their cognitive capacity.

After analyzing the interaction of the elements of learning environment, the theoretical framework, the results of the surveys and the completed observations, it can be said that there isn't a unique solution for creating the ideal learning environment. Multiple factors from teacher's teaching styles to community involvement, physical space and everything in between makes the ideal learning environment vary. Unquestionably, the teaching methods basically require a space that includes the elements mentioned previously for their correct implementation within the classroom and in turn, to provide future citizens with a suitable space where they can develop their motor, physical and cognitive skills.

This study can offer recommendations for the design of the learning environment, either based on physical elements or teaching methods, for improving the physical conditions of existing and future learning environments. This study suggests nine elements within the learning environment, which can vary according to the needs of teachers, children and the objectives of educational institutions. However, it is possible to propose some other elements for the creation of an effective learning environment fulfilling the

objective of the research and at the same time satisfy the users' needs. Consecutively it would be beneficial to make an analysis of different learning environments outside the selected area taking into consideration culture and surroundings by determining the design criteria peculiar to other kindergarten classrooms. The results of the classroom design evaluation emphasize the physical and functional components that are important to the experts. Therefore, it is expected that the interior space of a learning environment will be able to adapt to the teaching method, as well as the demands of the users. Also, it is expected a new view could emerge from the research in respect to the design criteria in the classrooms, as well as the elements within learning spaces.

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APPENDIX I Survey English Language

Dear participant,

In this study, the objective is to provide the basic guidelines for an efficient architectural design based on principles of three educational models (STEM Education, Multiple Intelligence, and Montessori). For this purpose, three schools will be taken to fulfill the purpose of it; the evaluation will be made in terms of implementation of educational models within learning environments.

This Survey has been done for the Master's Thesis to be written by PILAR ROBLEDO, in consultation with Yrd.Doç. BETÜL BİLGE. The information provided will be protected in accordance with the Laws and Regulations of the Republic of Turkey; for the purpose of being used in the writing of a Master's Thesis. Please tick (x) in the relevant parts of the following questions

Demographic information			
Gender	( ) Female	( ) Male	
Education	( ) Bachelor	( ) Master	( ) PhD
Work experience	( ) 1-5 years	( ) 6-10 years	( ) More than 11 years
Educational model applied at the current working place	( ) STEM Education	( ) Multiple Intelligence	( ) Montessori Method

Below you may find a few statements based on the teaching method criteria within learning environments; according to your experience and observations please tick (X) on each item from a rating of 1 to 5   5: Strongly Suits / 1: Non-suitable

A. Evaluate the **application of educational model** in the learning environment	5	4	3	2	1
Educates students in different disciplines					
Furniture corresponds to model principles					
Technological tools match with model principles					
Offers flexibility to fit different lessons					
Freedom makes possible for each child to find activities according to their needs					
Facilitates a creative environment and free play					
Allows student to be an active agent in learning process (significant learning)					

B. Evaluate the **role of student as an active agent** in terms of implementation of the educational model	5	4	3	2	1
Space empowers students to interact more effectively with themselves					
Space arrangement allows children to choose materials independently					
Collaboration and communication within the classroom is encouraged					
Creative and innovative self-teaching materials					
School furniture dimensions match students' anthropometry					
Space fosters self-confidence.					
Space promotes curiosity and interest in the learning environment					

C. Evaluate the **role of teacher as guide and observer** in terms of implementation of the educational model	5	4	3	2	1
Teachers can interact more effectively with students within the space					
Dimension space allows teacher to guide and observe students from every area					
Collaboration and communication within the classroom is encouraged					
Technological tools meet teachers' needs					
School furniture and materials meet teachers' needs					
Space offers opportunities to strengthen the student-teacher relationship					

D. Evaluate the **furniture and materials** in terms of implementation of the educational model	5	4	3	2	1
Concrete materials					
Promote self-education					
Aesthetic and creative					
Use of technological tools					
Integrates contents of the subjects					
Arranged according to different disciplines					
Self-correcting materials					
Fosters involvement of students in learning process					

E. Evaluate the **learning environment design** according to the educational model	5	4	3	2	1
Big and open spaces					
Contact with the exterior (windows, doors)					
Subdivided into thematic areas					
Promotes movement around the space					
Supports use of technology into class development					
Organized, aesthetic and clean					
Promotes children's independence in exploration and the learning process					
Creative environment					
Provides flexible spaces to carry out the projects					
Generates spaces to play and experience					

F. Expectations and needs in the learning environments

1. Could you indicate the strengths of existing learning environments that contribute to educational model implementation?

2. Could you indicate the limitations of existing learning environments in terms of interior architecture?

3. Do you think the learning environment design affect overall students' skills development? Why?

Değerli Katılımcı

Yürütülen bu çalışmada, 3 eğitimsel modelin (STEM Eğitimi, Çoklu zekâ kuramı ve Montessori Yöntemi) kurallarına dayanan etkili mimari tasarım ana hatlarıyla anlatılmaktadır. Bu amaç doğrultusunda,3 okul seçilerek , öğrenme alanlarının içinde eğitimsel modellerin uygulanması kriterine göre değerlendirilecektir.

   Bu Anket, Yrd.Doç. BETÜL BİLGE danışmanlığında PILAR ROBLEDO tarafından yazılacak Yüksek Lisans Tezi için yapılacaktır. Çalışmadan sağlanacak olan bilgiler Türkiye Cumhuriyeti Kanun ve Yönetmeliklerine göre korunacak olup; Yüksek Lisans Tezinin yazımında kullanılacaktır,

Lütfen aşağıdaki soruların ilgili kısımlarının içerisine (x) koyarak işaretleyiniz.

Demografik Bilgiler			
Cinsiyet	( ) Kadın	( ) Erkek	
Eğitim Seviyesi	( ) Lisans	( ) Yüksek Lisans	( ) Doktora
İş Deneyimi	( ) 1-5 yıl	( ) 6-10 yıl	( ) 11 yıldan fazla
Şuan çalışılan yerdeki uygulanan eğitim modeli	( ) STEM Eğitimi	( ) Çoklu zekâ kuramı	( ) Montessori Yöntemi

Öğrenme alanı içerisindeki eğitimsel model kriterlerine bağlı olarak ,aşağıda belirtilen başlıkları kendi deneyimleriniz ve gözlemlerinize göre (x) koyarak işaretleyiniz. Değerlendirmeleri 1 ile 5 arasında bir derecelendirme yaparak değerlendiriniz?
 1: Uygun değil /   5: Çok Uygun

A. Öğrenme mekânının "eğitim modelinin uygulanması" açısından değerlendirilmesi	5	4	3	2	1
Öğrencilerin farklı derslerdeki eğitimine olanak sağlaması					
Eğitim Modeli prensiplerine göre eğitim malzemelerinin uygunluğu					
Eğitim Modeli prensiplerle uyuşan teknolojik aletleri					
Farklı derslere göre uygun esneklik sağlaması					
Eğitim aktivitelerinde özgürlük sağlaması					
Yaratıcı etkinliklere ve özgür oyun ortamı sağlaması					
Öğrencilerin öğrenme süresince aktif rol oynamasına izin vermesi(önemli öğrenme)					

B. Eğitim modelinin uygulanması açısından "öğrencinin aktif bir birey olarak rolünün" mekânın değerlendirilmesi	5	4	3	2	1
Öğrencilerin kendileri ile verimli iletişim kurmalarını güçlendirmesi					
Çocukların eğitim materyallerini bağımsız şekilde seçmesine izin vermesi					
Sınıf içindeki iş birliği ve iletişim teşvik etmesi					
Yaratıcı, özgün etkin eğitim materyalleri sağlaması					
Okul mobilyalarının boyutları öğrencilerin fiziksel ölçüleri ile uyumlu olması					
Özgüveni desteklemesi					
Etkin olmayı teşvik eden eğitim malzemeleri					

C. Eğitim modelinin uygulanması açısından "öğretmenin rehber ve gözlemci olarak rolünün" mekânın değerlendirilmesi	5	4	3	2	1
Öğretmenler, öğrenciler ile mekân içinde daha verimli iletişim kurabilmesi					
Mekânın boyutu, öğretmenlerin öğrencileri yönlendirmesine ve bütün mekândan gözlemesine olanak sağlar.					
Sınıf içindeki iş birliği ve iletişim teşvik etmesi.					
Teknolojik aletler öğretmenlerin isteklerine cevap vermesi.					
Okuldaki eşyalar ve materyaller öğretmenlerin isteklerine cevap vermesi					
Öğretmen-öğrenci ilişkisinin kuvvetlendirmesine olanak sağlaması					

D. Eğitim modelinin uygulanması açısından "Eğitim Mobilya ve Malzemelerinin" değerlendirilmesi	5	4	3	2	1
Gerçek malzemeler (Gerçek yaşamdan)					
Etkin öğrenmeyi teşvik etmesi					
Estetik ve yaratıcığı keşfetmesi					
Teknolojik aletlerin kullanılması					
Derslerin içeriği ile bütünleşmesi					
Farklı derslere göre adapte edilebilmesi					
Düşündüren eğitim malzemeleri (yap-boz oyunları)					
Öğrenme sürecinde, öğrencilerin katılımını teşvik etmesi.					

E. Eğitim modeline göre "Eğitim mekan tasarımının" değerlendirilmesi	5	4	3	2	1
Yeterli ve Esnek olması					
Dışarı ile bağlantı olması					
Tematik alanlara ayrılması					
Mekanın öğrencilerin hareketli olmasını teşvik etmesi					
Ders geliştirmede teknoloji kullanımını desteklemesi					
Düzenli, estetik ve temiz olması					
Çocukların kendini keşfetme ve öğrenme süresince bağımsızlığını teşvik etmesi					
Yaratıcı etkinlikleri teşvik etmesi					
Oyun oynamak ve deneyim kazanmak için ortam yaratması					
Bağlantılı sınıflar sağlamsı					

F. Öğrenme alanlarında beklentiler ve ihtiyaçlar

1. Öğrenme mekânlarının güçlü yönlerini eğitim modelini desteklemesi açısından güçlü yönlerini değerlendirir misiniz?

2. Mevcut öğrenme mekânlarının, iç mekân tasarımı açısından eksik yönlerini değerlendirir misiniz?

3. Sizce, öğrenme alanının tasarımı öğrencilerin tüm becerilerinin geliştirmesini etkiler mi? Neden?

APPENDIX III Reliability Statistics Cronbach's Alpha

Case Processing Summary

		N	%
Cases	Valid	24	100.0
	Excluded[a]	0	.0
	Total	24	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.946	38