

Effective Learning Spaces: A Comparative Review of Educational Methods from Progressive Perspectives

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1. INTRODUCTION

It is undeniable that education is critical the evolution of modern societies. However, there are factors that affect schools in various ways, such as social, political and technological movements. Unfortunately, the schools have failed to keep up with the changes and transformations and still mostly facilitate the educational attitudes and philosophies adopted from the past century (Baker, 2012). Educational buildings, where teaching and learning activities take place, are important part of the education system. School buildings serve not only as educational facilities, but also as an important asset of the community and as a source of dominant aspects of education (Moore & Lackney, 1994). But more importantly, the extent to which school buildings enhance education has become an important issue for policy makers, educators, and design researchers, where it is also seen as a major focus in the fields of architecture and education. The needs in today's education system raise several that require immediate attention - what kind of schools and classrooms would we like to have in the future and how should we improve the schools that we have today? Even though the structure of classes and the overall educational activities have been transforming globally, we still observe traditional classroom settings where students are seated in rows regardless of the teaching methods that the teachers engage in and the teachers' interaction levels with students. Moreover, traditional classrooms are based on the concept that teacher is the only authority where students are not directed to see their peers as a source of learning or supported to interact and teach each other (Sharan, 1999).

However, ideally, learning should occur in an environment that can allow students to engage with the concepts that are being used by teachers with a maximum opportunity. This approach promotes the idea that students should become a part of the teaching practice in classrooms, rather than being passive receivers. In addition, it is important to have a broad sense of communication in classroom environments. It is teachers' task to create an environment for students for "the collision of reflections" that will eventually lead to students' skills and intelligence to express their opinions and develop outcomes forming bases for knowledge building. Therefore, teachers' role in classrooms and their interaction with students through their attitudes and motivational strategies play a crucial role in the overall teaching-learning process (Turner et.al., 2002).

2. A BRIEF HISTORY OF CONCEPTS OF SCHOOLS AND EDUCATIONAL TRENDS

The history of schools in the United States may not give us the answers to the current concerns directly, but can provide a basis to show how architectural design and layout of schools are associated with the evaluation of educational trends, pedagogical changes, curricular missions, teaching methods, and cultural values (Schools for the future, 2009). Therefore, in order to better establish an understanding of schools for future, a brief overview of the educational trends and concepts of schools in the United States is essential. This review provides an explanatory and useful basis for future research presenting how educational trends and concepts of schools aimed as well as shaped the changes in school buildings. According to Lippman (2010) the history of school design can be mainly categorized under six periods demonstrating what kind of trends, and innovations framed

the concepts and how the physical environments were designed to enhance the pedagogies behind the movements in the twentieth century (see Table 1).

Table 1. Overview of Concepts of Schools in the United States

Period	Colonial (1630s-1830s)	Industrial (1830s-1890s)	Progressive Era (1890s-1930s)	Modern Era (1940s-1970s)	Postmodern Era (1981-2000)	Twenty-First Century
Form of Education	Direct transmission of information from teacher to student	Focus on discipline and order	Child-centered education, focusing on individual needs	Standards-based teaching and learning	Smaller learning environments, community schools	Standardization of curriculum and school buildings
Education Environment	Primarily in church or home, limited interaction among students	Introduction of larger educational spaces and graded classrooms	Introduction of flexible classrooms and larger-scale school constructions	Innovative pedagogic reforms, open-school movement	Concept of smaller learning environments, alternative schools	Acknowledgment of unique characteristics of each school environment
Pedagogical Changes	Memorization of religious texts, little interpretation or student input	Shift towards interactive teaching, use of monitors for instruction	Emphasis on child participation and learning from each other	Introduction of standards and reactive approach	Static design approach, lack of classroom organization education	Recognition of contextual differences in school environments

In order to understand the purpose and the evaluation process of today's classrooms and their semantic and functional positions in the past, below is a brief summary of the periods where we can follow the concepts and changes chronologically.

Colonial period (1630s-1830s): Through coming from a colonized and agrarian society, this period shaped formal learning environments in which the form of education was based on delivering directly the information directly from teacher to student. The goal was to teach children a trade or a skill (Tanner & Lackney, 2005 as cited in Lippman, 2010) based on the notions of discipline and order (Finkelstein, 1975). The form of education in the colonial period was built upon the authority and had a definite practice of instruction in which students were not expected to interpret and give their point of views about what they were taught. Instead, they were only required to memorize the entire text, which was mostly about religion (Spring, 1986). Accordingly, public education during this period was usually taking place in church or home whereas the private education was only for the nobles. Since children at that time were expected to support their families, the primary focus of this period was teaching daily activities of home in one-room schoolhouses in which children used to spend only a few hours depending on their daily housework. There was limited interaction among the students, since they were expected to abandon all their spontaneity but just listen to the authority in the classroom, whereas collaboration was prohibited and accepted as cheating. Children were being punished for such activities (Finkelstein, 1975). Consequently, those learning facilities were organized like churches, where the form of classroom arrangements was based on arranging the chairs and desks in rows and also were barred to the floor in the classrooms (Bissell, 1995 as cited in Lippman, 2010).

Industrial Period (1830s-1890s): As a result of the industrial revolution and rapid development of factories, this period represents the concept of "efficiency", which eventually influenced the design of school buildings as well. Based on the notion of "manufacturing", the form of education was heavily criticized by some of the educational reformers such as Henry Barnard, James Carter, and Horace Mann, who advocated that free public education was a fundamental task of the country in order to achieve a strong



economic progress (Reese, 2011). During the early nineteenth century, the charity school movement and juvenile reformatories emerged as part of the general movement of reducing crime and poverty through the idea that educational institutions can solve the problems of society. The charity school movement was considered as the first-main approach that accepted schools as a mechanism to prepare and socialize children into an industrious way of life. Charity school movement also created a basis for another movement called the common school reform (Spring, 1986).

In consequence, "the common school" movement emerged from the needs of educating children in schools or churches that aimed to prepare and adapt them to the new industrialized environment by gaining better skills in a more formal way. Subsequently, as the cities expanded, the need for larger educational spaces arose and the "Lancasterian monitorial system" was pursued. As a result, children were started to be educated massively in urban areas (Bissell, 1995; Rieselbach, 1992; Rivlin&Wolfe, 1985 as cited in Lippman, 2010). Lancasterian monitorial system was introduced by Joseph Lancaster in 1798 in England and it was accepted as revolutionary for its time. The main idea behind this system was grounded in the organizational structure that supports the idea of massive public education by employing older and more experienced students as "monitors" in order to instruct the other students in the classrooms. This movement has been considered as one of the milestones in the history of US schools (Rayman, 1981). As a result, school buildings became more compounded environments keeping up with not only the growing mass of students but also the pedagogical changes in education, whereas there was a clear shift from teacher-based education to a more interactive form of teaching. Furthermore, with the development of the "Prussian school system" by Horace Mann, the idea of graded classrooms emerged based on the growing notions of age difference and developmental abilities among students (Lippman, 2010).

Progressive Era- Responsive in Idea and Reflexive in Education (1890s-1930s): During the late 19th century, a progressive movement emerged in Europe, as well as in the US as a result of a general critique of the public education. This concept was based on a child-centered education arguing that needs of states, church, or the economy should not be leading factor in shaping a child's development. This progressive movement in education was followed by the educators such as Friedrich Frobel in Germany, Maria Montessori in Italy, and John Dewey in the United States (Walden, 2009). As one of the major influences of progressive movement, educators started to think that educational programs needed to fit children's needs rather than children fitting the program (Pasalar, 2002). This new movement also brought the idea of interaction, hence children learning from each other as well. Therefore, participation became an important aspect of the education. The concept of flexibility (referring to the way that teachers and students manage their interactions) was introduced and the school structures were used to provide more stimuli to students to have more choices while working on tasks. During this period, the idea of L-shaped classrooms (Crow Island School) and large scale school constructions were introduced (Lippman, 2010). *Modern Era (1940s-1970s):* During the modern era, implemented standards for teaching and learning with a focus on schools' infrastructure, a reactive approach emerged promoting new spatial layouts, windowless classrooms and innovative pedagogic reforms (Lippman, 2010). One of the most important innovations was the open-school movement, a concept that influenced the design of schools from the late 1950s to 1970s. These schools were planned with large, open and flexible spaces, which were adaptable to team teaching and small-group instructions. However, this movement failed as soon as it began to be implemented due to noise, visual distraction and similar affects (Walden, 2009).

Postmodern Era (1981-2000): During this time period, the concept of smaller learning environments (i.e. academic houses with classroom clustered around the common areas), alternative school to public schools (freedom schools, street academies, etc.), concept of community school, and static design approach rather than seeing places as dynamic transactions emerged. During this period, teachers were still not aware of how to organize

their classrooms were not educated to learn how arrange their classrooms that would foster teaching and learning process (Lippman, 2010).

Twenty-First Century School Design: Conceptually, today's education is based on standardization of the curriculum as well as the school buildings. However, this standardization does not acknowledge that schools, children, and communities of practice are not analogues (Gardner, 1999; Ogbu, 1987; Sutton, 1996 as cited in Lippman, 2010). Because within each different context (such as suburban or urban) each school environment operates differently and has its own unique characteristics (Lave & Wenger, 1991; Wertsch, del Rio & Alvarez, 1995 as cited in Lippman, 2010).

In summary, although some educators and developmental psychologists acknowledge that effective learning occurs from activities when students and teachers work collaboratively (Dewey, 1956), schools have failed to keep up with the contemporary changes and transformations to contemporary concepts and movements. Instead, the schools continued to educational attitudes coming from the past century (Prohansky & Wolfe, 1975; Lewis et al., 1989; Kozol, 1991; US Department of Education-National Center for Education Statistics, 2000; Wagner, 2000; Chaney & Lewis, 2007; Baker 2012).

3. PHYSICAL ARRANGEMENT AND SPATIAL LAYOUT

During the early 1950's psychologists and other behavioral scientists began to show increasing interest in the relationships between built environment, human behavior and experiences. Through the development of the field of ecological psychology, research in classroom design started to pay attention to how classrooms function. The literature shows that the spatial arrangement and layout of classrooms have an influence on social interaction of both teachers and students, are important factors in implementing educational goals, communicate a symbolic message what is expected to happen in a particular place, and can communicate expectations of behaviors (Prohansky & Wolfe, 1975; Riwlin & Winstein, 1984; Gump, 1987).

Even though human beings have always been examining their environments since the dawn of history, employing research as a tool for designing better educational buildings is relatively a new approach. Early research efforts in 1930s showed the impact on educational buildings focusing on school lighting and ventilation. Research efforts later became more comprehensive in time and started to focus on different issues related to educational environment (McGuffey, 1982).

In the early 1950s, the relationships between the properties of physical settings and human behavior and experience were studied by behavioral scientists and psychologists representing a new field, which were known as "architectural psychology", "environmental psychology", and "ecological psychology". The origins of this focus area can be tracked down to the seminal studies that took place in the late 1950s and 1960s (e.g., *The Hidden Dimension*, *Function as the Basis of Psychiatric Ward Design*, *Image of the City*, *Notes on the Synthesis of Form*, *One Boy's Day*, and so on) (White, 1979).

Through this new approach, the field of architecture started to recognize the psychology of physical structures and architects began to acknowledge that the form and appearance of a building could influence certain behaviors that take place in when considering the occupants as active players of the environment. As a result, it has been widely accepted that physical settings such as schools, classrooms, libraries, offices and others define and shape the patterns of behavior. Through the development of environment-behavior studies, it was also claimed that behavior in an environment will be influenced by our awareness of the setting and the need to adapt to it. Therefore, not only the physical setting itself, but also the users' awareness can change the function of use of the space and values (Ittelson, 1974).



4. DESIGN OF SCHOOLS AND RESEARCH

Schools are complex environments with a range of people, including students, teachers, and staff, within a physical setting that includes the building as a whole, outdoor spaces, classrooms, which help shape the organizational structures including timetables, curricula and management (Woolner, 2015). School settings provide the environment that aims to achieve the educational goals, facilitate formal/informal intergroup processes including academic activities, communication, and movement patterns occurring within and through spaces (Pasalar, 2003). Previous research reveals which aspects of physical environment can interfere with learning without suggesting solutions. Because sometimes improvements suggested for different elements can conflict with each other. For instance, ventilation to improve air quality contributes to poor classroom acoustics; but more often they do not fit with more specific educational purposes as when open shelving to encourage independent learning threatens air quality through becoming dusty (Woolner and Hall, 2010 as cited in Woolner, 2015; Stringer, Dunne, & Boussabaine, 2012). Therefore, in order to better understand how schools and their design as physical settings contribute to educational activities and processes, Woolner (2015) argues that cross- disciplinary and interdisciplinary understandings are necessary drawing perspectives from both architecture and education. Review of previous research studies about educational facilities reveals that physical attributes directly or indirectly influence individuals' activities, movements and interactions.

4.1. Activity Patterns in School Environments

In most general terms, school environments include different activity settings, which are systematically connected and afford a series of behavior. Each activity setting has distinct relationships to one another, to the overall physical environment, and to behavioral, educational and social structure of the school community. Depending on the settings' features and spatial relations with each other certain behavior occurs frequently and continuously with the definition of the boundaries enclosing a setting. Some environments cultivate limited access through well-defined boundaries between settings allowing specific activities to occur, while some combine the places where sights overlap to advantage advancing easy access and allowing different types of activities to occur (Bechtel, 1977; Pasalar, 2002).

Due to the deliberate and goal-oriented nature of schools, activities are divided into a set of specialized units to achieve optimal learning and interaction for students. Schools compose subsystems, such as grades, teams, and individual classroom units. In order to maintain a continuum in educational activities, each school develops both formal and informal mechanisms that tie these subunits together. These mechanisms become the model of the activity system by forming the transactional environment for each of the subunits. The curricular processes provide the flow of activities, paths of communication, the means of collaboration among teachers, and the channels of monitoring for both teachers and students. In respect to today's changing demands and societal needs, it is necessary to consider the dynamic nature of schools in terms of their spatial definitions and educational process. Generally, the school administrations figure how the social environment will shape like in schools by controlling the activities taking place within the spatial boundaries. They distribute activities spatially and designate areas in which the activities are to take place. Each of these processes constructs the activity system of schools both temporally and spatially (Moleski and Lang, 1986).

4.2. Classroom Environments

Although researchers from different backgrounds may conceptualize the classroom space differently, they often share one thing in common that they classrooms as a site for solving problems where teachers and children are emancipated in order to make students more effective learners (Smeyers, 2013). It is also important that the classroom environment is a direct expression of the educational philosophy and it takes an active part in the educational process (Proshansky & Wolfe, 1975). It also has a preconceived cultural image

(David & Wright, 1975) and this image is embedded in our society (Martin, 2002). However, they are complex environments including different dimensions and variables (See Figure 1).

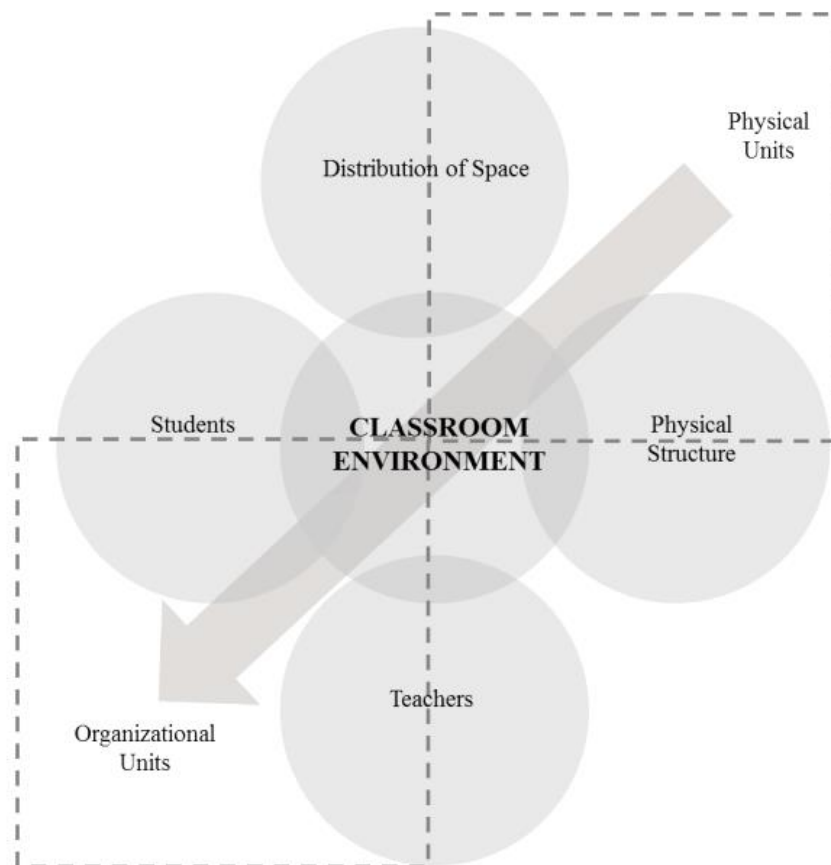


Figure 1. Main Units of Classroom Environment

In the literature, there is a difficulty of identifying conclusive research findings about the environmental factors related to classrooms that would promote effective teaching and learning, for a number of reasons: Lack of agreement about the nature of effective learning and how this may relate to the appearance of hard work and concentration; Lack of agreement about relevant factors or processes in the learning environment', and difficulty in understanding how they interact (for example, the factors included in different studies of class- room environments range from physical conditions and resources to social groups and relationships, curricular aims and activities, time- tabling, teaching strategies, values, images, rules and routines); Difficulty in measuring learning processes and outcomes (leading to a tendency to focus on students' observable behavior, such as time on task); Variability in the physical aspects of school environments. Diversity in students (their preferences and educational needs as well as personal characteristics like age and gender); and diversity in teachers such as their preferences, personal characteristics and teaching styles (Martin, 2006).

4.3. Physical Environment and Learning

While it is assumed that the physical environment impacts learning (Durán-Narucki, 2008; Kumar, O'Malley, & Johnston, 2008), it is still difficult to directly demonstrate the relationship and claim that better environments produce better learning. Previous contradictory and inconclusive research evidence, as well as contemporary experiences of school settings, show that the relationship between education and physical environment is both complex and interactive (Woolner, McCarter, Wall, & Higgins, 2012; Gislason, 2010; Higgins, Hall, Wall, Woolner, & McCaughey, 2005; Saint, 1987; Weinstein, 1979).



In addition, the classroom should be set up to set the stage for teachers to address the academic, social, and emotional needs of students (MacAulay, 1990). The standards for determining which spatial layout is most appropriate to fulfill these functions include ways to maximize the teacher's ability to see and be seen by all his or her students; facilitate ease of movement throughout the classroom; minimize distractions so that students are able to actively engage in academics; provide each student and the teacher with his or her own personal space while ensuring that each student can see presentations and materials posted in the classroom. Arranging the physical environment of the classroom is a way to improve the learning environment and prevent problem behaviors before they occur. Research on the classroom environment has shown that the physical arrangement can affect the behavior of both students and teachers (Savage, 1999; Stewart & Evans, 1997; Weinstein, 1992), and that a well-structured classroom tends to improve student academic and behavioral outcomes (MacAulay, 1990; Walker, Colvin, & Ramsey, 1995; Walker & Walker, 1991). In addition, the classroom environment acts as a symbol to students and others regarding what teachers value in behavior and learning (Savage, 1999; Weinstein, 1992).

Most researchers agree that well-arranged classroom settings reflect the following attributes:

Defined Spaces: Clearly defined spaces within classrooms that are used for different purpose and that ensure students know how to behave in each of these areas (Quinn, Osher, Warger, Hanley, Bader, & Hoffman, 2000; Stewart & Evans, 1997; Walker, Colvin, & Ramsey, 1995; Walker & Walker, 1991). For instance, classrooms will contain a high-traffic area around commonly shared resources and spaces for teacher-led instruction or independent work, such as rows of desks. A classroom for students with learning/behavior problems may have separate quiet spaces where a student can cool down or work independently (Quinn et al., 2000; Walker, Colvin, & Ramsey, 1995), include personal spaces that each student can call his or her own (Rinehart, 1991; Quinn et al., 2000), and provide areas for large and small group activities that set the stage for specific kinds of interactions between students and teacher (Rinehart, 1991; Walker, Colvin, & Ramsey, 1995). There may also be spaces to store items, computers, or audio-visual equipment.

Arrangement and Layout: Seating students in rows facilitates on task behavior and academic learning; whereas more open arrangements, such as clusters, facilitate social exchanges among students (MacAulay, 1990; Walker & Walker, 1991). It is useful to strategically arrange the classroom to limit student contact in high- traffic areas, such as the space surrounding the pencil sharpener and wastebasket, and instructional areas; and, to seat easily distracted students farther away from high- traffic areas (Bettenhausen, 1998; Quinn et al., 2000; Walker, Colvin, & Ramsey, 1995; Walker & Walker, 1991). All students should have a clear view of the teacher and vice versa, at all times (Quinn et al., 2000; Rinehart, 1991; Stewart & Evans, 1997; Walker et al., 1995; Walker & Walker, 1991; Wolfgang, 1996). In addition, the traffic pattern in the classroom allows the teacher to be in close physical proximity to all students (Shores, Gunter & Jack, 1993; Wolfgang, 1996).

Limiting Visuals: There is some evidence that it is useful to limit visual and auditory stimulation that may distract students with attention and behavior problems (Bettenhausen, 1998; Cummings, Quinn et al., 2000).

Special Needs: There is good reason to strategically place students with special needs or behavior problems in close proximity to the teachers' desk (Bettenhausen, 1998; Wolfgang, 1996). Shores and his colleagues (1993) recommend that this should be done not only to monitor student problem behaviors, but also to facilitate teacher delivery of positive statements when compliant or otherwise appropriate behaviors are exhibited.

In summary, the literature shows that it is important and advantageous to have classroom that are orderly and well organized.

4.4. The Relationship Between Educational Approaches and Design of Learning Facilities

Different types of practices, instructions, and interactions can change the nature, use and experience of learning environment. These relationships and the practices of teaching and learning mediated in learning spaces have been found to have an important effect on learning outcomes through the complex relationships of teaching (Oblinger, 2006).

According to Blackmore et al., (2010), the main assumptions that build the design disciplines of learning facilities can be summarized as follows:

- Educational objectives and practices have fundamentally changed from the teacher-centered 20th century factory model and therefore learning spaces must address the educational needs of learners in the 21st century (Chism, 2006; Fisher, 2002; Temple, 2007). The relationship between space and identity formation is embedded historically in environmental psychology principles (e.g. Good and Adams 2008, Carter 2006, Ferrer-Wreder et al 2008), and more recently around issues and notions of personalization.
- Design principles are open to the re-interpretation according to the cultural context as typical school buildings and classroom layouts symbolize culturally specific understandings and philosophies of education as well as to resource distribution (Bateman, 2009), for example, the Reggio Emilia's notion of the 'environment as the third teacher'(New, 2007; Rinaldi, 2006).
- Changing learning spaces based on the above principles will have subsequent effects in influencing teacher pedagogies and therefore student learning (Oblinger, 2006; Sanoff, 1995; DEECD, 2009; Flutter, 2006). In other words, good design leads to good teaching practices and improved learning because the quality of the building design has flow on effects on teacher and student behaviors, morale and practices and therefore learning outcomes.

5. METHODOLOGY

The literature shows that there are many ways to create an environment that assists better learning environments and design of physical environment itself is an important tool for achieving such goals. In the literature, there are three progressive approaches that can represent best relationship between educational methods and the design of learning places; Reggio Emilia (Diana School), Montessori, and Waldorf (Steiner) schools as they relate to shaping the classroom and school environment. The aim of this study is to examine these three educational movements and their relations with physical environment from a historical and architectural point of view and highlight overlapping ideas and differences. Therefore, the article analyses the educational philosophies of these educational movements and discusses how they used and shaped the physical environment in order to fulfill their philosophies and foster both cognitive and behavioral inputs.

5.1. Educational Philosophy of Reggio Emilia and Design Disciplines

In most general terms, this concept represents a collection of schools for young children in whom each child's intellectual, emotional, social, and moral potentials are carefully improved, refined, and guided. The school system that developed based on Reggio approach have become one of the most innovative movements in education through its assumptions, curriculum and pedagogy, the method of school organization, and design of the physical environments as well over the past 50 years (Edwards, Gandini, & Forman, 1993). One of the main emphasis in this approach is perceiving children as unique subjects with own rights rather than simply needs, and having people as resources to not simply resolve or answer questions, but rather to guide children observe and explore answers. Furthermore, the Reggio approach is based on the philosophical viewpoint that all knowledge derives from the process of self-and social construction; therefore, establishing communication structure in the social system in the school is crucial (Rinaldi, 1993).

The key notions, which are inherent in Reggio approach, can be summarized as follows:



- i. The image of the child: This notion represents an educational belief that children have unlimited potential to learn and are driven by curiosity and imagination, when they are valued, listened, and loved. Valuing children through listening, and giving them time and space to express themselves can be seen as the essential attribute of the Reggio approach, in which this attribute is called "pedagogy of listening" for a better understanding of the learning process (Valentine, Scottish Consultative Council on the Curriculum, & Learning and Teaching Scotland, 2006).
- ii. The expressive arts in the pre-school establishment: This notion expresses the importance of using arts as a tool for learning through daily detailed drawing activities where students are also engaged in expressive exercises such as sculpture, dramatic play, shadow play, dancing, music, ceramics, constructing, writing and so on. It is accepted that, inherently, young children are artistic enough with a full capacity for sharing their perceptions and feelings. Their imagination also operates as a major part in child's exploration for knowledge and understanding (Valentine, Scottish Consultative Council on the Curriculum, & Learning and Teaching Scotland, 2006). This conception in the Reggio approach along with the idea of image of the child created and shaped one other important aspect of the approach, "atelier". This idea was guided through the belief that every child is a creative child, full of potential with the passion to create in many ways through using many languages where they can explore in ateliers with diverse materials and sources (Gandini, 2005).
- iii. Progettazione: In most general terms, this key element represents the notion of "emergent curriculum" or "child-centered curriculum" (Valentine, Scottish Consultative Council on the Curriculum, & Learning and Teaching Scotland, 2006). Rather than establishing the curriculum in advance, in emergent curriculum, teachers are expected to express general objectives and make assumptions about what direction the activities and projects might take in order to be prepared appropriately. However, the curriculum is developed and materialized in the process of each activity and/or project and should be adjusted flexibly when needed (Gandini, 1993) and it continues to emerge as the children learn and grow (Finegan, 2001).
- iv. Community and parent-school relationships: This aspect represents the Reggio educators understanding of learning and teaching, as it is defined as "pedagogy of relationships", which can be traced through the key role given to participation at every level; both within school between children and also outside of the school between families and school and the community as well (Valentine, Scottish Consultative Council on the Curriculum, & Learning and Teaching Scotland, 2006). According to Reggio approach, education needs to occur in a sense that each child is seen in relation to other children, family, teachers, the school environment, community, and society (Gandini, 1993). Other than defining "developing relationships" as a goal in this approach, collaboration among children also refers to how children get along with each other in a social sense as well (Krechevsky & Stork, 2000).
- v. Environment: One of the most important aspects of the Reggio approach is the creation and use of the physical environment. The basic principles of physical space in Reggio schools can be best described as a series of linked spaces that are connected to each other, with a maximum opportunity for children to move without restrictions (Valentine, Scottish Consultative Council on the Curriculum, & Learning and Teaching Scotland, 2006).
- vi. The most distinguishable features of physical environment in Reggio schools are: (1) piazza (the central meeting places where children share their play and activities, and collaborate), (2) mirrored interiors (to represent the philosophy of "seeing oneself"), and (3) ateliers where children work in the art studios with a professional artist called atellerista (Abbott & Nutbrown, 2001). Since schools are multi-sensory environments, creating environments, which allow children to engage with different materials and textures is also an important feature of physical environments

through "aesthetic codes". The term "aesthetic codes" comes from Rosario and Collazo (1981) who looked at the kind of children's artwork valued by teachers in two preschool classrooms. Rosario and Collazo elaborate on Pierre Bourdieu's study on the sociology of perception in which Bourdieu described aesthetic perception as a social construction that is learned either consciously or unconsciously (Tarr, 2001). In Reggio approach, pedagogues accepted aesthetics as a stimulating promoter in teaching and learning, and the classrooms of Reggio have become a source of aesthetic inspiration in the design of early learning facilities which were followed in both U.S. and Canada (Vecchi, 2010 as cited in Apps & MacDonald, 2012). The outdoor spaces, on the other hand, should encourage children to create a link between the indoor and outdoor spaces helping them to understand what is happening "on the outside" (Valentine, Scottish Consultative Council on the Curriculum, & Learning and Teaching Scotland, 2006).

- vii. Teachers and documentation: Cooperative working is one of the most important aspects of Reggio approach where teachers work in pairs, each pair of co-teachers is responsible for a small group of students (Abbott & Nutbrown, 2001). In Reggio approach, teachers have the opportunity to interact and collaborate with both each other and professionals such as artists and scientists (Valentine, Scottish Consultative Council on the Curriculum, & Learning and Teaching Scotland, 2006). One other important aspect related to teachers is that it is teachers' responsibility to document children's experiences in the classrooms through taking notes, making observations, and recording conversations among children systematically as a basic-usual activity (Finegan, 2001).

Reggio approach suggests that all knowledge derives from the process of self-and social construction. It is also necessary for the teachers to create a personal communication with each child and establish this system and/or network of relationships in the social system within the school (Rinaldi, 1993). Education, is seen as a part of a larger ecological system. Therefore, school are expected to create an environment with opportunities for teachers to interact with both children and other teachers as well. Since the relationships and communications can be promoted through layout of school setting, which unifies and arranges all the elements (such as light, air, plants, colors, textures, open space, and etc.), this approach, in fact, acknowledges the built environment as the "third teacher" (Edwards, Gandini, & Forman, 1993; Finegan, 2001). Therefore, the physical environment of the classroom and the school itself becomes an important element in Reggio approach, rather than perceiving classrooms as a room, which simply contains desks and chairs. Based on the literature review, the design principles of Reggio approach that shaped classroom environments can be summarized as follows:

- i. Using "transparency" in the physical environment by using transparent materials allowing natural light (Apps & MacDonald, 2012)
- ii. Having diverse materials in terms of color and texture (Edwards, Gandini, & Forman, 1993; Finegan, 2001; Tarr, 2001).
- iii. Creating a central meeting space and mini ateliers in the classroom (Edwards, Gandini, & Forman, 1993; Abbott & Nutbrown, 2001).
- iv. Connecting the outside-open space with classrooms (Valentine, Scottish Consultative Council on the Curriculum, & Learning and Teaching Scotland, 2006; Apps & MacDonald, 2012).
- v. Organizing and arranging the learning settings in classrooms based on experiences, which are particular to the environment through the heuristic approach of documentation.
- vi. The classroom environments should be flexible enough in terms of layout and arrangement so that the children can move freely and explore the tasks and materials without restrictions. However, it has been found that conventional and/or traditional classrooms are difficult to meet these expectations. Because traditional classrooms are designed to enhance teacher or authority-based teaching model, this supports an archetype that forms and conceptualizes teachers as a source that



performing on “the stage” where students are seated in rows and facing the front wall and the teacher. Therefore, the inherent message that those traditional classrooms deliver to both students and teachers drives the function in the classroom and play an important role in the overall teaching and learning process (Apps & MacDonald, 2012). On the contrary, educators in Reggio schools pay great attention to what the physical environment affords, and teach children in classrooms where they call the physical environment as the “third educator” (Gandini, 1998 as cited in Tarr, 2001).

- vii. Other than the thoughts on classroom layout, giving flexibility to children to allow them to make changes in the material and furniture sorting and/or arrangement are also found to be important design implications in the Reggio approach (Gandini, 1999; 2005).

In summary, Reggio approach has shown how interaction and collaborations between children, teachers, atelieristas (artists), parents and the community in early childhood can have a powerful influence on all learning that occurs in classrooms, whereas certain physical aspects of the classroom environments can support and enhance the overall learning process through increasing children’s awareness and can provide places for wonder, curiosity, and the expression of ideas.

5.2. Educational Philosophy of Montessori and Design Disciplines

In most general terms, the Montessori education is a child-centered educational approach based on scientific observations and experimentations of children from birth to adulthood. The materials used by Montessori emphasize the sensory discrimination to improve the cognitive achievements of children with mental retardation, which led to the development of a full activity-based educational program for children from birth through age 12 (Lillard, 2011). The main purpose of Montessori education is to raise children and offer them freedom without anarchy, and discipline without rigidity. One of the main aspects of Montessori education is that the education should fully develop children’s positive potentials that will make them happy and useful members of society. In order to meet this requirement, the education should be based on scientific principles (Wentworth, 1999). Therefore, in Montessori, it is very important to provide opportunity and stimulation under the control of trained Montessori teachers where children experience, gain new impressions and learn by doing. This guidance requires an understanding of the child development. Thus, Montessori approach recognizes the child’s spontaneous interest in learning, and values the child’s right to learn by him or herself freely through emphasizing the importance of creativity and concentration (Orem, 1974).

Montessori approach emphasizes the importance of physical environment by expressing that “the environment must be prepared” with tools that promote learning opportunities by encouraging learners to explore their environments through self-directed and co-operative learning activities (Lippman, 2010). This approach suggests that the prepared environment plays a crucial role in the teaching and learning experiences, and constantly provides additional guidance with respect to developing it. Accordingly, the teacher is responsible for the environment more than in traditional approaches, and the environment should be adjusted based on the child and his/her needs. The teachers should help the children to engage their attention and concentration with the help of the environment (Dyck, 2002). Because education in Montessori is based on the idea that children can independently choose the educational activities when they are developmentally ready. Therefore, the design and arrangement of the physical classroom environment to facilitate independent learning is a crucial part of the Montessori education. One of the most important characteristics of Montessori classroom is the attention given to visual order and beauty, careful display and arrangement of artwork, furniture, and the cooperative activities within the classroom where the entire school is defined as the “Children’s’ House” (Fisher, 2008). In addition to the importance given to physical environment and display

of art works, one other innovative aspect occurred in Montessori schools is the design and use of L-shaped classroom environments (Dyck, 2002).

5.3. Educational Philosophy of Waldorf and Design Disciplines

Waldorf (Steiner) education is a humanistic pedagogical approach, which is based on the educational philosophy of the Austrian philosopher Rudolf Steiner (1861-1925), the founder of anthroposophy in which the word is derived from "anthropos" (man) and "sophia" (wisdom), representing the notion of a modern spiritual scientific understanding of the human being and the world (Uhrmacher, 1995). Even though Steiner's ideas on education are based on the beliefs on individual development, the Waldorf School takes its starting point from anthroposophical spiritual science (anthroposophy), which views the human being as composed of body, soul, and spirit (Ullrich, 1994). In Waldorf education, one of the main concerns is the development of the soul of the school-age child. Steiner suggests that children grow through the following stages (Uhrmacher, 1995):

- i. The first stage is defined as the time of imitation where children from birth to age seven learn by empathy and doing, because human beings develop as imitators through imitating their surroundings. Therefore, acting morally and doing good things are very important. Steiner suggests that in this first stage of development, learning passes through the child's entire physical being. Also, Waldorf education suggests that for the emotional development of children who are under nine, it is important that they develop their relationship to the world, as people tend to do when they conceive of it imaginatively. So, if teachers themselves are not dreamers, then they cannot turn children into dreamers as well (Steiner, 1996).
- ii. In Waldorf education, teachers do not teach children to read or memorize the information that they deliver until the age of seven, the phase that the second stage begins. Because they believe that the etheric body is still tied to and working on the physical body before age seven (Steiner, 1967). The second stage, which lasts until the age of fourteen, depends on teaching through vivid pictures, images, and rhythm, because these awaken the forces of feeling. Because Steiner defines this stage as the phase of feeling, which is related with the rhythmic system-the heart and lungs where children capture the information mainly through image and rhythm during these years. Also, Steiner suggests that children who are in this stage develop the need for authority, which should not be misled the desire for controlling the child but rather by "the child's natural response to its teacher" and not "an enforced authority. It is the kind of authority which creates the right rapport between child and teacher" (Steiner, 1986). Also, Steiner states that after the age of nine, the need for authority changes from an inherent belief in everything teacher says to a need for explanation. Thus, teachers should be aware of this change and must adapt their relationship with children (Uhrmacher, 1995; Childs, 1996).
- iii. The last stage (to the age twenty-one), is described as "the release of the astral body, the body of consciousness" in which thinking and judgment are the two key elements of the stage. The instruction in the Waldorf School begins with an artistic point of view, where the educators develop writing from art, and then reading from writing (Steiner, 2001). The curriculum in Waldorf School is aimed to be integrated into Gardner's multiple intelligences. Steiner's approach is based Gardner's model and perception, which suggests beginning with the child's need and constructing a curriculum accordingly. Teachers, on the other hand, should nurture and encourage child's imagination in order to develop in a healthy way, using pedagogical approaches that avoid mass media and information technologies, especially screen-based technologies, particularly in the early years (Leonard & Willis, 2008).

According to Steiner (1996), spaces that have rectangular shape activate human thinking a can keep it to rigid and linear, where they represent "being efficient" and "narrow minded". On the other hand, circular spaces represent a more spiritual and heightened sense of feeling. Therefore, Steiner proposes that these two shapes together reflect "thinking" and "feeling" through architectural design as well. Accordingly, the classroom



for the youngest grades should be designed more rounded, whereas the classrooms for older children should be more rectangular as the child's thinking development keep evolving (Poplawski, 2009; Jolley, 2010).

Along with the pedagogical perspective behind, the Waldorf buildings follow Steiner's claim whereby "school must be a utilitarian building which demands an artistic form". Therefore, the built environments are designed carefully, based on Steiner's pedagogy, in which "right angles and symmetries are avoided both horizontally and vertically. Color and light are also manipulated in a specific manner, related to color plans developed for ages and activities. Steiner suggests that different colors and their application in spaces deliver different messages. He further argues that red, being a more active color and blue, being a more passive color, relate to the mental concentration (Jolley, 2010). This approach shaped the Waldorf classrooms in a way bright red color is used for that first grade, orange color is used for the second grade, blue purple color is used for the eighth grades where the color gradually loses the red/active color as students in each grade gets mature and become less active beings (Walden, 2009).

Having children to meet and interact with the nature, as well as gaining an appreciation for the nature is also an important aspect of Waldorf education. Therefore, creating small courtyards in addition to being surrounded with natural elements is also a one of the unique aspects of Waldorf Schools. Similar to Reggio approach, the importance of art in Waldorf education, on the other hand, also influenced the school's architecture through including different materials in classroom design (Jolley, 2010).

6. DISCUSSIONS

There are many similarities that exist between these three early childhood educational models and the continuation of the physical environment that will support all aspects of the development of children is carried out with the design of educational space. All offer non-traditional options for educators and have been established as strong alternative early childhood educational models and shaped the physical environment accordingly. Overall, each educational philosophy has its own unique approach to learning and physical environment design, but all three prioritize student-centered learning and encourage creativity and exploration. The following table aims to provide a simplified and comparative overview and generalization of the key characteristics within each educational approach:

Table 2. A comparative table highlighting the key characteristics of the physical environment in Reggio Emilia, Waldorf, and Montessori schools

	Reggio Emilia	Waldorf	Montessori
Approach	Emphasizes collaboration, exploration, and creativity	Nurturing and aesthetically pleasing environment	Ordered and structured environment
Physical Space	Open, flexible spaces	Warm and inviting classrooms	Specially designed materials and child-sized furniture
Materials	Natural and *open-ended materials	Organic materials	Specially designed materials
Lighting	Natural lighting	Gentle lighting	Adequate lighting
Connection to Nature	Emphasizes natural elements	Incorporates nature	Emphasizes order and simplicity
Purpose	collaboration, and creativity	free play, and connection with nature	Fosters independence, concentration, and self-discipline

* Objects and resources that have multiple possible uses or interpretations.

As summarized in the table, Reggio Emilia schools recognize the physical space as a crucial component of the learning environment. They consider it as a "third teacher" alongside the actual teachers and peers. The design of the physical environment in Reggio Emilia schools is carefully planned to promote exploration, collaboration, and creativity among students. The spaces are open and adaptable, allowing for flexibility in how they are used. Natural lighting and materials are incorporated to create a welcoming and aesthetically pleasing



atmosphere. This use of natural elements helps to establish a connection with the outside world and brings a sense of calm and harmony to the learning environment. By providing open and adaptable spaces with ample natural lighting and materials, Reggio Emilia schools aim to inspire curiosity, independent thinking, and imaginative play.

Waldorf schools place a strong emphasis on creating a nurturing and visually appealing environment. The physical space is designed to stimulate imagination, free play, and a connection with nature. Natural elements are integrated into the classroom, such as wooden furniture, soft lighting, and organic materials. These elements create a warm and inviting ambiance that promotes a sense of comfort and security. The intention is to provide a sensory-rich environment that supports children's imaginative play, creativity, and artistic expression. By incorporating natural materials and gentle lighting, Waldorf schools seek to foster a harmonious and holistic learning experience that encourages self-discovery and a deeper connection with the natural world.

In contrast, Montessori schools focus on an organized and structured setting. The physical environment is carefully arranged to support the principles of independence, concentration, and self-discipline. Specially designed materials are provided to facilitate hands-on learning and promote cognitive development. The furniture and equipment are child-sized, allowing students to easily access and manipulate the materials independently. Everything in the environment has a designated place, emphasizing order and structure. This organization helps to cultivate a sense of discipline, responsibility, and self-control. The deliberate design of the physical environment in Montessori schools aims to foster an environment where students can actively engage in purposeful activities, concentrate on their tasks, and develop important life skills.

7. CONCLUSION

The educational methodologies of Reggio Emilia, Waldorf, and Montessori schools have greatly influenced the design of the physical environment to accommodate the cognitive and behavioral needs of students. Reggio Emilia schools consider the physical space as a vital "third teacher" that promotes exploration, collaboration, and creativity through open and adaptable spaces with natural lighting and materials. Similarly, Waldorf schools prioritize creating a nurturing and visually appealing environment, incorporating natural elements, gentle lighting, and organic materials to stimulate imagination, free play, and a connection with nature. In contrast, Montessori schools focus on an organized and structured setting, utilizing specially designed materials and child-sized furniture to foster independence, concentration, and self-discipline.

Overall, each educational approach—Reggio Emilia, Waldorf, and Montessori—recognizes the significance of the physical environment in supporting students' cognitive development, encouraging positive behavior, and promoting active participation in their learning journey. The design of the physical environment in these schools reflects their respective educational philosophies and aims to create a conducive space that meets the unique cognitive and behavioral needs of the students.

In conclusion, the educational methodologies of Reggio Emilia, Waldorf, and Montessori schools have demonstrated the power of the physical environment in shaping the learning experience. By viewing the physical space as an integral component of education, these approaches have emphasized the importance of creating environments that inspire curiosity, imagination, and independent exploration. The thoughtful integration of natural elements, adaptable spaces, and specially designed materials has provided students with opportunities to engage actively in their learning, fostering their cognitive development and behavioral growth. As we continue to explore innovative approaches to education, it is essential to recognize and appreciate the profound impact that the physical environment can have on students' educational journeys. By prioritizing the design of educational spaces, we can create environments that nurture the whole child, cultivating their



intellectual, social, and emotional well-being, and empowering them to thrive in an ever-evolving world.

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