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**DESIGN PRINCIPLES THAT ENCOURAGE
CREATIVITY IN EARLY CHILDHOOD EDUCATION:
FOCUS ON BRUNO MUNARI METHODOLOGY**

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APPROVAL

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I, BEGÜM AYTAÇ GÖZCÜ; hereby declare

- that this Master of Arts Thesis that I have submitted is entirely my own work and I have cited and referenced all material and results that are not my own in accordance with the rules;
- that this Master of Arts Thesis does not contain any material from any research submitted or accepted to obtain a degree or diploma at another educational institution;
- and that I commit and undertake to follow the "Kadir Has University Academic Codes of Conduct" prepared in accordance with the "Higher Education Council Codes of Conduct".

In addition, I acknowledge that any claim of irregularity that may arise in relation to this work will result in a disciplinary action in accordance with the university legislation.

Begüm Aytaç Gözcü

06/01/2025



*To my daughter Bilge Ada, who makes me look at the world with more curiosity and
love... May your future be bright and full of creativity...*

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DESIGN PRINCIPLES THAT ENCOURAGE CREATIVITY IN EARLY
CHILDHOOD EDUCATION:
FOCUS ON BRUNO MUNARI METHODOLOGY

ABSTRACT

This thesis focuses on Bruno Munari's methodology by considering preschool education spaces as a multi-sensory playground, preparing for a future where the creativity of individuals in early childhood is fundamental for social progress and personal development. It focuses on the educational philosophy and methodology of Bruno Munari, who created environments and activities that nurture the creative thinking and problem-solving skills of children between the ages of 3-6, which is considered to be an important age range where learning and development take place intensively, where the child's basic habits are formed and creativity develops, emphasising learning through the five senses and learning by doing. It brings interior design proposals to pre-school education spaces, where interaction with nature and sensory elements is weak, based on the infrastructure gained from Montessori and Reggio Emilia Education approach. The study emphasises the importance of sensory-rich environments, flexible learning spaces and the integration of play and art to enhance children's cognitive and emotional development. Munari's 'laboratori' workshops are presented as exemplary models for sensory and experiential learning, showing how art and play can stimulate imagination and self-expression. As a result, the thesis emphasises how these workshops and the Bruno Munari approach can be applied in interior design, contributing to the development of children. The study includes spatial design proposals that support sensory experiences such as texture, colour, sound and smell in educational environments to encourage creativity. By integrating Munari's principles of learning through the five senses and learning by experimentation and contemporary insights into educational space design, it offers a proposal for creating enriching and supportive environments that foster creativity from early childhood.

Keywords: Creativity, Early Childhood Education, Sensory Interior Design, Bruno Munari Methodology

ERKEN ÇOCUKLUK EĞİTİMİNDE YARATICILIĞI TEŞVİK EDEN TASARIM
PRENSİPLERİ:
BRUNO MUNARI METODOLOJİSİ ODAĞINDA

ÖZET

Bu tez, erken çocukluk dönemindeki bireylerin yaratıcılığının toplumsal ilerleme ve kişisel gelişim için temel olduğu bir geleceğe hazırlayan okul öncesi eğitim mekanlarını çok duyulu bir oyun alanı olarak görerek Bruno Munari metodolojisine odaklanır. Öğrenme ve gelişimin yoğun olarak gerçekleştiği, çocuğun temel alışkanlıklarının olduğu ve yaratıcılığın geliştiği önemli bir yaş aralığı olduğu kabul edilen 3-6 yaş arası çocukların yaratıcı düşünme ve problem çözme becerilerini besleyen, beş duyu aracılığıyla ve yaparak öğrenmeyi vurgulayarak ona uygun ortamlar ve aktiviteler yaratan Bruno Munari'nin eğitim felsefesi ve metodolojisine odaklanır. Özellikle doğa ile etkileşimin ve duysal öğelerin zayıf olduğu okul öncesi eğitim mekanlarına Montessori ve Reggio Emilia Eğitim yaklaşımından edindiği altyapıya dayanarak iç mekân tasarım önerileri getirir. Çalışma, duysal açıdan zengin fiziksel ortamların, esnek öğrenme alanlarının ve çocukların bilişsel ve duygusal gelişimini geliştirmek için oyunun ve sanatın entegrasyonunun önemini vurgulamaktadır. Munari'nin '*laboratori*' adlı atölyeleri, sanatın ve oyunun hayal gücünü ve kendini ifade etmeyi nasıl teşvik edebileceğini göstererek duysal ve deneyimsel öğrenme için örnek modeller olarak sunulmaktadır. Sonuç olarak tez, çocukların gelişimine katkıda bulunan bu atölyelerin ve Bruno Munari yaklaşımının iç mekan tasarımlarında nasıl uygulanabileceğini vurgular. Çalışmada, yaratıcılığı teşvik etmek için eğitim ortamlarına doku, renk, ses ve koku gibi duysal deneyimleri destekleyen fiziksel tasarım önerileri yer almaktadır. Munari'nin beş duyuyla öğrenme ve deneyerek öğrenme ilkelerini ve çağdaş iç görülerini eğitim mekan tasarımına entegre ederek, erken çocukluktan itibaren yaratıcılığı geliştiren zenginleştirici ve destekleyici ortamlar yaratmak için bir öneri sunmaktadır.

Anahtar Sözcükler: Yaratıcılık, Erken Çocukluk Eğitimi, Duysal İç Mekan Tasarımı, Bruno Munari Metodolojisi

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1. INTRODUCTION

1.1 Definition of the Research Problem

Creative thinking is among the skills classified as 21st-century skills (Bateson and Martin, 2013). Today, creativity is used effectively in many fields, such as science, technology, art and sports, especially in developed countries. However, creativity is still not fully recognized in education and should shape essential thinking in all these fields (Florida, 2019). The discovery of new abilities in our brains every day proves the accuracy of many theories on creativity and thinking skills and sheds light on education. Creativity, necessary for better coping with stress and problem-solving skills, should be acquired in the education system (Florida, 2019; Torrance, 1965). It aims to raise a generation that leads and produces, not imitates and takes models, and this depends on creative thinking education. Therefore, it is important to include 21st-century skills in education. Recognized by educators, business leaders, academics and government agencies, these skills encompass the abilities, learning dispositions, literacies and competencies necessary for success in 21st-century societies and workplaces. These skills focus on equipping children, who will be the creative adults of the future, with the required skills to succeed in a rapidly changing digital society (Florida, 2019).

The emergence of creativity and the generation of innovations with a creative thinking mindset requires a critical perspective and collective intelligence inspired by different ideas. Creativity, essential for generating new ideas and personal happiness, has become a sine qua non in fields such as science, technology and the arts and should be nurtured from an early age (Torrance, 1965). Brain development in the early years influences all aspects of an individual's development, learning capacity and behaviour in childhood and adulthood. It also forms the basis for competence and coping skills in later life. In this context, the creativity deficit negatively affects the economy. It is directly related to early childhood development, education, health care, equity and social capital, given that it inhibits scientific and technological creativity. Considering that these factors affect each other, it is clear that a system that affects them will naturally contribute to economic

growth and human development (İnan, 2017). Therefore, early childhood education plays a critical role in developing creative abilities that are increasingly necessary for success in the modern world (Florida, 2019). Thus, every investment in early childhood education, such as the development of creativity, contributes to a country's human and economic investment.

While the term 'early childhood' broadly covers the period from birth to eight years of age, focusing on the preschool years allows for a more precise examination of the developmental milestones and educational interventions relevant to this age group. In particular, children between the ages of 3-6 experience the fastest stages of physical and psychological development, and curiosity, creativity and imagination develop between the ages of three and six (Olds, 2001). According to Fisher (2005) all children are born with the ability to be creative. However, considering that children's creativity and problem-solving skills can best develop in a play environment, it is important to create an environment that supports creativity and educates the senses to develop this ability. Play, the primary purpose of childhood, is a means of learning, creating, gaining experience, communicating and preparing for adulthood. Therefore, the leading role of education should be to create an environment in which creative thinking can be developed in all areas of human intelligence and to encourage the use of these abilities. Such encouragement cannot be achieved by teaching alone; it must also be supported by the creation of a flexible environment in which creative potential can manifest itself and be fully utilized at every stage of human life (Torrance, 1965). Children spend a significant part of their lives at school. Considering this, school becomes a place where children feel more comfortable than at home. Preschool education environments play an important role in fostering this sense of belonging (Bilgiç and Surur, 2016). Today, however, most of the traditional educational institutions are not aware of the necessity of creativity (Orhon, 2014). In order to reach a more contemporary and effective education system than the traditional education system, it is essential to grasp the requirements of the age. In traditional education systems, elements such as lessons, curriculum, homework and class schedules are structured without considering the interests and needs of the child (Kafadar, 2016). This approach prioritizes the curriculum and the teacher. In schools where traditional discipline methods are dominant, students are expected to obey

unconditionally. Since there is no active participation in traditional education, learning becomes difficult, and the acquired knowledge is quickly forgotten. In order to prevent such problems, children should be placed at the centre of educational activities as active participants in the learning process, and innovative approaches should be applied accordingly. Environment designs that do not encourage or encourage individuals to participate in activities lead to a decrease in children's perspectives. Research supports this even in very young children (İnan, 2017). The view that the decrease in creativity ability at later ages is affected by the school environment and system is also taken into consideration. Therefore, the impact of the environment on creativity is important. Schools should support and nourish the senses, and the creativity of a child growing up in the necessary environmental conditions develops positively (Ceppi and Zini, 1998; Guilford, 1986). Considering the developmental characteristics of children in early childhood and the limitations of traditional education models, it is clear that stimulus-rich environments are very important for their learning and growth (Cadwell, 2003).

Educational buildings around the world offer a multidisciplinary field of study covering various branches of science and art, such as architecture, design and psychology, with a user-centred approach. Considering that educational buildings primarily address children with psychological and physical development needs, they stand out as building types that require a user-centred approach (Dudek, 2007). In the preschool period, children complete two-thirds of their mental development and about four-fifths of their nervous system development. Therefore, the quality of education received in the first five years directly affects the level of realization of the child's potential power. For this reason, activity programmes for children of this age should be sensitive to their rate of development. For all these activities designed by educational scientists to achieve their goals, space designs made with the right decisions are needed. For this reason, the design of the spaces offered to children in this age period should be investigated from many aspects, and design criteria should be determined because the positive findings that creativity can be developed with appropriate and correct educational environments, appropriate materials and methods are similar all over the world. The physical environment, which plays an important role in encouraging creativity, can be transformed into an inviting and stimulating space thanks to features such as abundant natural light,

various textures and flexible furniture arrangements. (Bilgiç and Surur, 2016; Orhon, 2014; Rinaldi, 2006)

There are many advocates who have adopted these ideas to develop environments that holistically support the development of the child and have human-centred, user-centred design approaches that encourage creative processes (Caplan, 2017; Sayın, 2021). One of them, futurist Bruno Munari, adopted a didactic approach and integrated children's sensory exploration into art, design, and education to develop a multifaceted approach that supported their creativity and learning processes. Munari's methodology provides a framework that allows children to not only learn specific information but also to understand the world using their senses and creativity. This is an important aspect that distinguishes Munari from other educators and designers. Although other educators have made significant contributions in this field, Munari's methodology stands out from others in integrating art into education and encouraging children's sensory exploration through art and play. Munari's creative, holistic and multidisciplinary pedagogical approach, which emphasizes play, exploration and multisensory elements as fundamental elements in the creative process, focuses on the child's creativity and development, especially in the context of play, art and sensory exploration. Bruno Munari, whose thoughts and practices are known to go beyond certain boundaries and have a universal character, was influenced by his experiences in the Far East and Zen Buddhist philosophy and focused on his process rather than the resulting product (Coşkun Orlandi, 2010; Sperati, 2020). Munari's search for inspiration and his approach to design is characterised by his interest in the East, particularly Japan. The skills of Japanese craftsmen, such as building style, use of materials and symbolic summarisation, have been an important source of inspiration for Munari. In addition, he felt a cultural and spiritual affinity with the simplicity of Zen philosophy and the value it places on the integrity of human nature. Therefore, Munari advocates that a designer should not only address aesthetics and functionality, but also appeal to the sensory perceptions of the person using the design (Altomonte, 2014). The comprehensiveness and universality of Munari's ideas and methods make Munari's approaches valid in many different areas. These are important features that make Munari different and unique from an ordinary artist or designer.

Bruno Munari's approach to integrating art, play and multisensory experiences in education provides a framework for creating environments that actively support children's creative development. Munari's methods align with the need for environments that go beyond traditional, restrictive models of education by encouraging hands-on, exploratory learning. Munari has strongly emphasized the problem with traditional schooling's emphasis on oral communication. According to him, today's children are tomorrow's adults. He proposed that they should be helped to live away from a stereotyped life, develop their senses, and become more sensitive. According to him, creative children are happy children (Coşkun Orlandi, 2010; Restelli, 2002). Advocates of creative approaches in education, such as Bruno Munari, aim to create flexible and inspiring learning environments where children can express themselves freely and develop their creative thinking skills through play and art. Bruno Munari's approach to integrating art and play into educational settings emphasizes sensory workshops, the use of natural materials, multisensory experiences, and natural and modern technological tools, allowing children to experiment freely and express themselves without the constraints of predefined outcomes (Restelli, 2002).

In this context, the main problem addressed in this study, focussing on Bruno Munari's methodology to encourage creativity in children aged 3-6 years and considering the space as a multisensory playground, is the following: How to improve the sensory context of early childhood education spaces that have adopted early childhood education approaches such as Montessori and Reggio Emilia, but where access to nature is restricted.

With all this in mind, this research focuses on the design of preschool interiors through the lens of Bruno Munari's methodology. It aims to explore and answer the following main and sub-questions by considering the space as a multisensory physical playground for children:

Main Research Question: How can the spacial design of preschool educational spaces with limited access to nature and natural sensory elements be improved in a sensory context in order to foster creative skills of children?

Subquestions:

- i. How does Bruno Munari's methodology combine play and art to encourage sensory exploration and creativity in children aged 3-6?
- ii. What role do interactive workshops, such as Munari's labs, play in developing sensory experiences and stimulating creative thinking in preschool settings?
- iii. What are specific sensory design elements and sensory materials that can be integrated into preschool environments to support children's creative development?

1.2 Scope of the research

This research covers the design of preschool interiors and environments with a focus on Bruno Munari's methodology, which encompasses sensory exploration and experiential learning. Investigating the relationship between creativity and play, it treats the area as a multisensory play area with a didactic approach for children aged 3-6, an age range where learning and development occur intensively, and the child's basic habits are formed. Munari's idea of 'learning with the five senses' and his workshops called 'laboratori' a source of inspiration for understanding how multisensory design can support creativity in early childhood education interior design that adopts methods such as Reggio Emilia and Montessori. This study, focusing on Munari's methodology with a Futurist background, proposes how modern technologies and sensory design details can be integrated into multisensory interiors of preschool education spaces that have limited opportunities to interact with nature but try to adapt to the limitations of urban environments.

1.3 Methodology

This research uses a literature review as its methodology to examine and analyze design, theories and practices, spacial design elements, creative interactions and different philosophies and educational spaces that encourage sensory engagement by understanding and questioning the relationship between creativity and play in early childhood education.

Starting with the urge to conduct research on universal and child-centred design, this study initially began with an inquiry into kindergarten education, different educational models and design principles. The progression and structure of this research is shown in Figure 1.1, which outlines the structural development of the thesis. The focus was on the differences in curriculum, interior design and the children educated in each of the different educational methods between the curriculum and teacher-oriented traditional educational approach and preschool education approaches such as Montessori, Reggio Emilia, Waldorf, Froebel, Dewey, which refer to the body and the five senses for learning and emphasize the need to reactivate the sensory aspects of education and to give importance to creativity. The common characteristics of these schools were identified as their child-centred approach, learning by experience, emphasis on sensory development and the use of natural materials and environments. Thus, the fact that these schools emphasize creativity and creative thinking skills, which are expressed as 21st-century skills, brought the study to the next step. Therefore, the main areas of focus included understanding the relationship between creativity and play and exploring the integration of art and play. This study has shown that ‘Art as Play’ can facilitate ‘Art and Creative Development for Early Childhood’, thus opening the door to sensory play and learning through the five senses. Among the educational approaches researched in this context, it was concluded that the Italian Montessori and Reggio Emilia approaches play a more central and fundamental role in sensory experience in education. These results led the study to ask questions about the Montessori educational approach and the methodology of Bruno Munari, who is referred to as the founder and compared to the Reggio Emilia educational approach, and how he integrated play and art to foster creativity. In this context, these educational approaches emphasize the importance of creativity and interaction with nature and how Bruno Munari's Methodology was investigated. For Munari, technology was not an ideal or a myth but in the first instance an instrument. Also, he never tried to impose any abstract or ideas onto his technicians, but always sought their collaboration, by making any object, any work of art, “on the field”, working alongside with people who used these technologies in their everyday trade. In this way, it was focused on how interior design can be further developed in a sensory context. In this context, the structural development of thesis explained in Figure 1.1 is as follows:

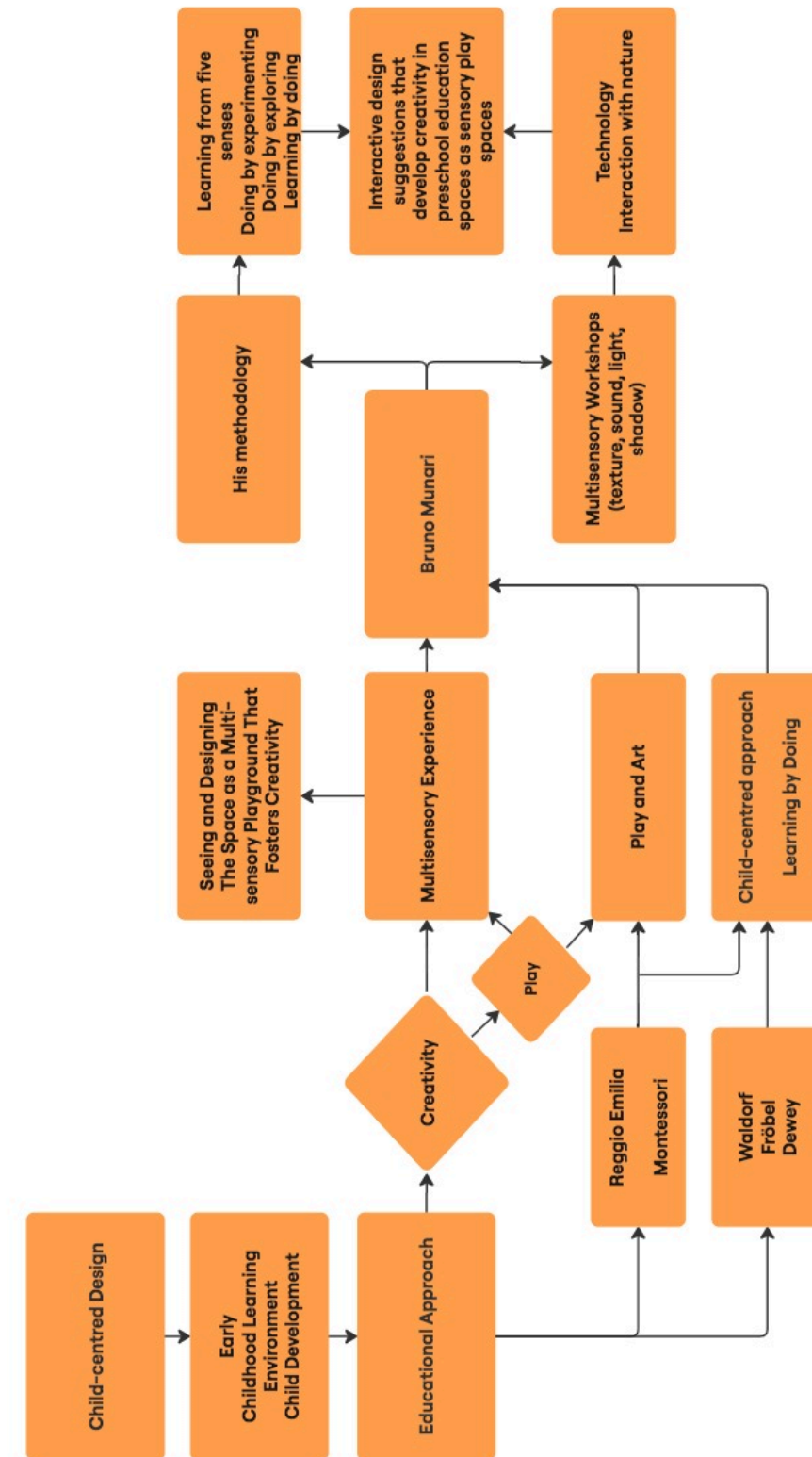


Figure 1.1 Structural development of the thesis

How this research progressed and shaped the study is summarised in Figure 1.1: Structural Development of the Thesis. In this context, it reflects how the research evolved from the exploration of educational principles to the development of Munari's methodology and its implications for sensory design in early childhood education.

Two development theorists who have made significant contributions to the concept of play are Jean Piaget and Lev Vygotsky. Piaget emphasized that play is critical in the development of a child's imagination and saw play as a cognitive process that supports children's development (Piaget, 1951). However, Vygotsky (1896-1934) conducted similar research in a different context and offered an alternative to Piaget's cognitively orientated work (Ray, 2019). Vygotsky's work suggested that play is not only a cognitive process but also an emotional process and is a fundamental source of development in preschool years (Vygotsky, 1966). Both theorists emphasized how play nurtures creativity and flexibility and emphasized its important role in children's developmental processes (Ray, 2019). These approaches, which focus on cognitive and sensory development, have influenced how philosophers such as Huizinga and educational institutions discuss play. Bruno Munari, an artist and designer but also an intuitive pedagogue who adopted the didactic principle, has many similar approaches to Piaget. Both are against imposition, and both recommend methods such as experimentation, research, and self-discovery (Restelli, 2002). Although he does not identify himself as a pedagogue, his son Alberto Munari, who was also a student and collaborator of Piaget, states that Munari applies the basic principles of active pedagogy.

The research highlights Bruno Munari's contributions to educational approaches and creativity in the context of early childhood education by referring to child-centred educational models such as Reggio Emilia and Montessori. Therefore, it includes Munari's biography, methodology, workshops, and the concept of learning through the five senses, as well as an examination of play and art. Munari's innovative methodology emphasizes the importance of integrating play and art into early childhood education. The interconnectedness of the work demonstrates the multifaceted nature of educational design and underlines the need for a holistic approach that incorporates various educational philosophies and design principles to create stimulating and nurturing environments for children.

At this point, by understanding Bruno Munari's methodology and philosophy, his work and ideas for the development of creative educational methods in early childhood education are discussed. Based on this idea, the chapter discusses contemporary individualistic and experience-oriented educational approaches such as the Montessori and Reggio Emilia approach, which are similar to Munari, and explains the philosophy of each approach, the characteristics of education, the elements in education and the physical environment.

1.3.1. Literature review on Bruno Munari

There are names such as Ezio Bonini, Giulio Confalonieri, Silvio Coppola, Franco Grignani, Giancarlo Iliprandi, Michele Provinciali, Roberto Sambonet, Albe Steiner, Studio Boggeri, Massimo Vignelli, Heinz Waibl, Enzo Mari who were generally influential in the Italian design world in the mid-20th century (Caplan, 2017). These were architects, graphic designers, industrial designers or artists. Many of these names, such as Bruno Munari, took part in the Italian design world and were pioneers of modernist movements and design. They worked in a versatile way in both graphic design, industrial design and art. They experimented with different aspects of design. However, although they have some common points with Munari, there are also some important differences that separate Munari from the others (Piazza, 2010). Munari stands out from other names with his focus on children's education and the development of creative processes. While he stands out with his works on creativity, play and learning, the other names generally worked on more commercial designs or projects aimed at adults. Munari, who emphasizes that design is not only aesthetic but also scientific research, has examined this area in more depth through workshops he organized, especially on children's sensory development. He argued that sensory experiences and play are important in design and implemented this understanding through workshops. Other designers, on the other hand, focused more on visual communication and functional design (Piazza, 2010; Caplan, 2017). In addition, there are important similarities and some differences between Munari and architect Herman Hertzberger. Hertzberger's architecture parallels Munari's creativity-encouraging spatial designs in terms of emphasizing social interactions. Hertzberger focuses on creating spaces that encourage human behaviour and facilitate social interaction. He aims to design flexible and open spaces that facilitate people's social connections in schools,

offices and public buildings. In this respect, it overlaps with Munari's concept of designing spaces that encourage creativity in education. Like Munari, Hertzberger believes that architecture is a tool that enhances human experience and stimulates creative processes. However, while Munari's designs focus more on small-scale projects such as educational materials and children's books, Hertzberger is interested in architectural scale, public buildings and large-scale projects (Sayın, 2021). As a result, at this point, the main difference why Munari was chosen in this study is his work that supports children's education and creativity, sensory development and learning through play and art, and his innovative approach based on learning by experience and learning with the five senses.

The study also analyzed different views and research on Bruno Munari in order to add deeper insight and knowledge. In addition to the books written by Munari himself, the sources written and the work carried out by Munari's successors, whose educational methods are still practised today, are also analyzed. Silvana Sperati, Beba Restelli, Hisanobu Fujita, and Alberto Munari, a student of Jean Piaget and also the son of Bruno Munari, are among them. In addition, the following are reviews of some of the theses written worldwide in the last 20 years with a focus on Bruno Munari.

Nicoletta Altomonte's thesis (2014), *'Bruno Munari and educational communication: origins, methods, audience.'*¹ focuses on Bruno Munari's didactic activities and takes a broad view of his educational approach. The thesis explores the connection between Munari's artistic and educational work and analyses the foundations of Munari's educational methodology, particularly from a perspective beyond art education. The first part of the thesis examines the theoretical approaches underpinning Munari's educational philosophy, including important theories such as Gestalt psychology, structuralism, semiology and Zen philosophy. Munari's 1967 lectures on 'visual communication' at Harvard University are analyzed as an important example of this methodology. Munari's relationship with Piaget's theories of child education and the Italian Educational Cooperation Movement² is also explained in detail. In this context, it is emphasized that Munari is an important figure not only in the field of art education but also in the fields of visual communication and aesthetic education in general. The

¹ *Bruno Munari e la Comunicazione Didattica: Origini, Metodi, Pubblico*

² Movimento di Cooperazione Educativa (MCA)

second part of the thesis deals with Munari's applied didactic projects. These projects include educational work for children and adults and provide information on how Munari approached these different audiences. Projects such as his toy designs with children, picture books and workshops in museums are discussed as concrete examples of his creative educational methodology. In conclusion, Altomonte's thesis explores Munari's wide-ranging understanding of education, both theoretical and practical, and shows how his pedagogical approaches intersect with international pedagogical approaches. Valeria Gratzova's thesis titled '*Application of Bruno Munari's Didactic Method in Art Education*' (2023) investigates the applicability of Bruno Munari's didactic method in art education. Gratzová uses the techniques from Munari's book *Drawing a Tree* in art classes to develop students' creative thinking processes. The thesis analyzes how these methods can be used, especially at the primary school level, and how they affect students' artistic abilities. Gratzová's work *Application Of Bruno Munari's Didactic Method in Art Education* offers an alternative to traditional approaches in education by shedding light on the aspects of Munari's methods that encourage creative thinking. The first part of the thesis focuses on Munari's life and work, especially his children's books. Munari's famous book *Drawing a Tree* and how the method in this book is used in art classes are explained in detail. The thesis also analyzes the basic concepts in art education, with a special emphasis on motivation and creativity. The didactic part of the thesis presents a project outline for the application of Munari's tree drawing method. In this section, a series of exercises are carried out that focus on students' creative thinking and artistic processes. Students perform tasks such as drawing and modelling trees using Munari's methods. These exercises aim to assess students' creative processes and artistic approaches. Although the thesis initially planned to apply various didactic methods of Munari, the scope of the study was narrowed down to focus only on Munari's method of drawing trees. In this context, it investigates how students' artistic abilities are developed through Munari's creative approach and compares it with the national curriculum.

Zaffarano and Estorick's work, *Bruno Munari: Complexity and Creativity* (2012), analyses Bruno Munari's work in an artistic context with a focus on creativity. Munari is portrayed as an interdisciplinary artist and designer who defies categorization. His work spans a variety of fields, including fine art, design and education, and is characterized by a creative approach, interdisciplinary experimentation and a defiance

of formal style. This has led scholars to conclude that Munari's work is difficult to categorize. The article emphasizes Munari's consistency and innovation throughout his career and mentions an exploratory, experimental method. By comparing it to the career trajectories of other artists whose creativity often stalled, the authors emphasize Munari's enduring creativity that remained dynamic over decades.

Lindsay A. Caplan's thesis (2017) '*Open Works: Between the Programmed and the Free, Art in Italy 1962-1972*' explores how Bruno Munari and other Italian artists dealt with the concept of "programmed art" in the 1960s and their relationship with cybernetic theories. Caplan analyses in detail how these artists bring together the concepts of freedom and control in their work and offer viewers an experience of active participation and transformation. The thesis analyzes the effects of this interaction between art and technology on social structures and the potential for change.

Guabello Federica (2022) analyses the work of Bruno Munari, the versatile artist of the 20th century who, after his artistic experience in the Futurist movement, established himself on the Italian design scene and whose objects, such as the Cubo ashtray and the Falkland lamp, made him one of the main Italian designers. There are also descriptions of the children's world that gave life to numerous projects, including storybooks, primary school books, a television programme and the first art laboratory for children. Finally, it discusses his design orientation towards children and his creation of toys and products that won him two of the prestigious Italian design awards, the Compasso d'Oro.

Pierpaolo Antonello's Beyond Futurism: Bruno Munari's Useless Machines. Futurism and the Technological Imagination (2012) considers Munari's early relationship with the Futurist movement and relates it to his departure from its ideological and aesthetic tendencies. Antonello contrasts Bruno Munari's pragmatic and constructivist view of technology with Futurism's obsession with speed, power and war. The paper also offers an ironic critique of the Futurist obsession with technology in Munari's 'Useless Machines', suggesting a more harmonious and natural integration of art, technology and everyday life. The paper also examines how Munari was influenced by movements such as Dadaism and Constructivism and shows how his work breaks away from traditional categories of art and design.

Ayşe Coşkun Orlandi's article Experimental Experience in Design Education as a Resource for Innovative Thinking: The Case of Bruno Munari explores how experimental experience in design education fosters innovative thinking, focusing on Bruno Munari's approach as both a designer and educator. It focuses on Design education, covering different fields with creative problem-solving processes such as product design, graphic design, communication design and design in engineering, using both 2D and 3D methods and based on enhancing creativity through project-based work with a focus on analytical and creative aspects. According to him, with the advancement of technology, the need for innovation has also increased, leading to a deeper examination of the relationship between creativity, innovation and design education. In the study, Munari's role is analyzed in the context of being an important figure in Italian design history whose experimental design background contributed significantly to innovation. Munari's educational methods, which focus on experiential learning, aim to develop students' creativity by encouraging them to learn through discovery. His approach, based on trial and error, improvisation and autonomy, emphasizes the value of discovery and play in nurturing innovative thinking, says Coşkun Orlandi. In this way, it continues to influence modern design education. Through the Munari case study, the article focuses on how design education can nurture creative thinking and sustain innovation.

Hisanobu Fujita's work (2022) focuses on tactile workshops developed by Bruno Munari, specifically exploring their impact on children's active learning through the sense of touch. Fujita analyses how Munari's tactile-oriented workshops support creativity, sensory engagement, and learning through experimentation, drawing on Munari's educational philosophy. By exploring the methodologies behind tactile learning, the research provides insights into how these workshops can create a deeper connection between sensory experiences and learning in early childhood education.

All of these works offer a comprehensive view of Munari's influence on design, education and art. They particularly emphasize Munari's innovative pedagogical methods, such as experiential learning, creative exploration and interdisciplinarity. Munari's contributions are valuable as a foundation for modern approaches to fostering creativity and innovation in different disciplines. By addressing a variety of fields and methods, these related studies draw attention to Munari's role in shaping the way

creativity is taught and understood through different disciplines. Consequently, this literature review aimed to identify gaps by analyzing past research and to make new propositions with a particular focus on Bruno Munari's methodology. As a result of the thesis reviews, insights inspired by Munari's innovative methods and approach were adopted and integrated into the study.



2. CREATIVITY AND PLAY IN EARLY CHILDHOOD

2.1 Understanding Creativity and Its Relation to Early Childhood

The true sign of intelligence is not knowledge but imagination.

Albert Einstein

Creativity is one of the most studied and increasingly important issues today. Definitions of creativity are in different forms. When the definitions related to creativity are analysed, the common concept of "new" or "novelty" draws attention. In an event or process that can be considered creative, there are features such as novelty, originality, and being different or extraordinary (Sternberg, 2005). On the other hand, one of the most striking activities of human beings is to use their mental abilities to create a new product. For this reason, many scientists and artists emphasise the importance of creating, and many educators work on how to develop children's creativity abilities (Erdoğan, 2006). Sternberg and Lubart (1996) stated that the elements of "novelty" and "appropriateness" are necessary for a creative product and believed that creativity, like intelligence, is present in every person to some extent and that the creativity level of each individual can be developed to varying degrees by sharing the same view with Torrance (1965). The fact that creativity is defined in many different ways shows the complexity of creativity, but since various aspects of creativity are addressed in the definitions, all of them are important (Bozoklu, 1994). Creativity is multidimensional and experiential. The varied forms of creativity that we typically regard as different from one another, other technological creativity (or invention), economic creativity (entrepreneurship), and artistic and cultural creativity, among others, are deeply interrelated. Not only do they share a common thought process (Florida, 2019). The rise of a new social class named by Richard Florida, the Creative Class, spanned science and technology, traditional knowledge workers and the professions, and the arts, media, and culture. Its rise, it seemed to Florida (2019), was the social force behind a host of emerging and seemingly unrelated trends. It was this new class that was reshaping how we work, how we live, and what we want in our communities, and, in doing so, transforming the very rhythms,

patterns, desires, and expectations of our daily lives.' According to Florida (2019), the economic need for creativity has led to the emergence of a new class, referred to as the Creative Class. Florida defines the core of the Creative Class individuals in fields such as science and engineering, architecture and design, education, arts, music, and entertainment, whose economic function is to generate new ideas, new technology, and new creative content. Surrounding this core, the Creative Class also encompasses a broader group of creative professionals in business and finance, law, health care, and related fields. These professionals engage in complex problem-solving that involves a significant amount of independent judgment and necessitates high levels of education or human capital. Furthermore, all members of the Creative Class, whether they are artists or engineers, musicians or computer scientists, writers or entrepreneurs, share a common ethos that values creativity, individuality, difference, and merit.

According to Beetlestone (1998), creativity is necessary for individuals to cope with social problems. According to Torrance (1965), creativity is based on the processes of being sensitive to the problem, defining the problem, searching for a solution, making predictions, making and testing hypotheses, and then presenting the solution. Creative thinkers see opportunities where others only see problems (Baer, 1997). Thus, it offers different lifestyles to the individual and, at the same time, saves him/her from the stress of modern life (Sternberg, 2005). According to Bateson and Martin (2013), creativity means producing new/ original actions or thoughts, especially by recombining existing actions and thoughts in new ways or applying them in new situations. Creativity and creative thinking are two different concepts that are used interchangeably, although they do not mean the same thing. Creative thinking is very important because it breaks the bond between established understandings and habits and makes the mind open to new ideas and possibilities (Fisher, 2005) and it guides the individual in solving individual and social problems, thereby facilitating and enhancing one's life (Cropley, 2001). According to Mayesky (1995), creative thinking begins when a new solution to a problem is found or when what can happen without something is considered. Torrance (1995) and Guilford (1986) mention four stages of creative thinking. These stages are as described below: Fluency, Flexibility, Originality, and Elaboration.

- i. Fluency: Fluency of thinking is the ease with which we use stored information when we need it. The more a child generates ideas in play and informal settings, the more fluent he will be in generating solutions to the real and important problems of life.
- ii. Flexibility: Flexibility is the ability the child has to overcome mental blocks to alter his approach to a problem. Children may get stuck by assuming rules and conditions that do not apply to a problem.
- iii. Originality: Originality or novelty is shown by an unusual or rare response. It can also be assessed by the game of consequences, and thinking about the future can stimulate original ideas. Examples of questions that are taken from the Torrance Test of Creative Thinking that can be used as stimuli for students to produce original ideas are as follows: What are the symbols that describe the word "sleep"? What would happen if ropes hung from the sky? Etc.
- iv. Elaboration: Elaboration is shown by the number of additions that can be made to some simple stimulus to make it more complex.

Creative learning does not mean learning creativity. We can teach people to think creatively through appropriate methods, but creative learning is a broader process that involves the individual, methods, materials, collaborations, and similar factors. Creativity is used in the field of design, considering design as a way of designing, a way that, while being as free as fantasy and as exact as invention, encompasses all aspects of a problem, not only image like fantasy, function like not only invention but also the psychological, social, economic, human aspect (Munari, 2007). For Bruno Munari, creativity requires an elastic intelligence, a mind free from preconceptions of any kind, ready to change its opinions when a 'fairer' one presents itself, as creativity is formed and transformed continuously (Panizza, 2009). For instance, In Bruno Munari's 'Flight of Fancy,' he explores the possibilities of 21 dots (Figure 2.1). This book presents a visual narrative to trigger readers' imagination and encourage them to see ordinary objects from a different perspective. In this work, Munari emphasises how objects and ideas can be rediscovered through visuals and how the design process can be made more creative with a free and flexible mind instead of rigid rules. Munari, who argues that creativity is not only an aesthetic phenomenon but also a functional, psychological, and social approach, offers clues about the process of putting creativity into practice with visual narratives in this

book. The visuals show how Munari establishes a link between freedom and imagination in creative minds and how routine thought patterns can be broken. In this context, Munari's visual artifacts also emphasise the power of materials used in creative learning processes. In figure 2.1 below, the images in Bruno Munari's *Flight of Fancy* represent the freedom and flexibility of creative thinking processes. Through these images, he presents how design can develop at the intersection of imagination and functionality. (Munari, 1998)

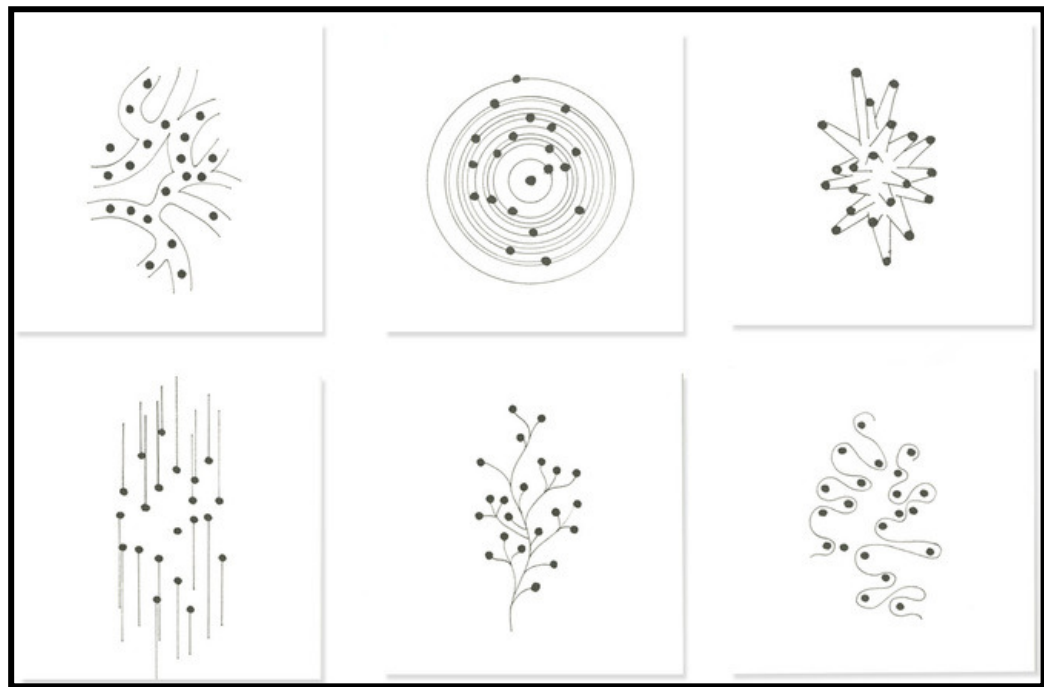


Figure 2.1 Bruno Munari's *Flight of Fancy* (Munari, 1998)

Beetlestone (1998) emphasised that six elements must be present to define creativity and stated that creativity consists of a cognitive way of learning; description (expressing ideas and feelings); productivity (imagination, creation, creation, authorship, performance); originality (risk-taking and unorthodoxy); creative thinking and problem-solving (coming up with different and less obvious solutions); and the universe and creation nature (emotional interaction between the individual and the environment). Similarly, Beetlestone (1998) argued that every human being has more or less creativity and that all children are able to reorganise ideas and construct meaning in original ways. Torrance (1995) defined creativity as "the process of forming ideas or assumptions, testing assumptions, and communicating results." This idea states that creativity involves

producing something new or original and involves thinking "beyond the limits." This includes exploration, investigation, imagination, invention, and curiosity. Torrance also points out that creativity is evident in scientific theories, inventions, improved products, novels, poems, designs, paintings, music, and dance.

In addition, according to Bateson and Martin (2013), human creativity is a complex set of abilities that can be measured in various ways. Torrance also made the concept of creativity and divergent thinking skills systematically measurable. Torrance developed a test called the Torrance Test of Creative Thinking, which measures the fluency, flexibility, and originality dimensions of student creativity. This test has an important place in measuring creativity. On the other hand, creativity is an ability and a thinking process that exists in all emotional and mental activities, in all kinds of work and endeavours, and forms the basis of all aspects of human life and development. Dean Simonton (2013) writes that "creativity is favoured by an intellect that has been enriched with diverse experiences and perspectives" and that it is "associated with a mind that exhibits a variety of interests and knowledge." Creativity supports mental or cognitive development. It involves many high-level thinking skills, including observation, problem-solving, exploration, analysis, hypothesis generation, prediction, testing, and communication (Özgen, 2022). While creativity connotes both mental and performance-based activities, creative thinking connotes more mental activities and usually emerges in free and democratic environments.

Rollo May (2019), in his book *The Courage to Create*, says: "Creativity is the encounter of the consciousness of a concentrated human being with his own world. We express our being by creating." Thus, creativity is a necessary continuation of existence. A creative mind does not always have an innate characteristic. Everyone can have the capacity to think creatively. However, the artistic background due to art education focuses on creativity, which makes the field a unique creative resource. In this context, Torrance (1965) argued that creativity can be learnt. He emphasised that it should not be left to chance from birth and that creative potential should be directed. According to him, if this energy is not well directed and supported, there is a danger of it being channelled in an undesirable direction.

Such environments encourage children to explore, express, and develop their creative potential through play and interaction, as highlighted by Torrance's (1965) theory of creativity being cultivated through supportive environments. Dr. E. Paul Torrance, a children's creativity advocate, engages with preschool children in a creative learning environment. Torrance's work emphasized that creativity is not just an innate trait but can be nurtured and developed through the right educational approaches and environments, as seen in his interactions with young learners in Figure 2.2 shows Dr E. Paul Torrance actively engaged with preschool children in a creative learning environment. This image reflects Torrance's philosophy that creativity can be nurtured through playful interactions and supportive environments that emphasise collaboration.



Figure 2.2 Environments that foster creativity through play and interaction, as emphasized by Torrance's theory (URL1)

Similarly, Torrance (1995) stated that creativity involves finding something new for the child and contributing to the group to which the child belongs and emphasised the importance of discovery and invention. In general, preschool children's approach to creativity is much freer and simpler. Since their self-consciousness is not fully developed during this period, children are very creative and confident about the ways they express themselves in creative activities. Since creative actions are not learnt, it is easier to observe creativity in children. Children have the will to push themselves to the act of

creation without realising it. Their imagination, feelings, and thoughts are combined with motivation from within and they express their thoughts freely (Özden, 1993). Therefore, according to research findings, while creative thinking is recognized as an inherent talent, it can also be cultivated through learning. Studies conclude that individuals with this natural ability can enhance their creativity if they are provided with suitable programs and environments designed to foster their creative skills. Moreover, as can be seen from all the above descriptions, various authors emphasise different elements such as product, process or personality structure in their views on creativity. Torrance (1974) states that children's creativity decreases when they start school because of academic expectations and authority. Creativity reaches its peak around the age of thirteen, and after this age, it either remains as it is or starts to decline. Environmental factors are at the root of this decline. So, what is common in almost all descriptions is the "environment" factor. Whether in terms of product, process or personality traits, environmental factors nourish or hinder creativity (Öncü, 1992). According to Runco (2014), children's creativity shows different characteristics than adults. In revealing and developing the creativity ability in children, it is important to train and develop the senses, which play an active role in creativity at an early age. Because the child discovers and perceives his/her environment with the help of his/her senses. The child should be allowed to make observations and evaluate his/her observations in perceiving his/her environment and should be helped to develop his/her imagination by talking and discussing with the child (Bozoklu, 1994).

2.2. Understanding Play and Its Relation to Creativity

The definition of play can be misleading due to its various forms and definitions. Although there is no single definition, theorists propose several factors that help differentiate play from other activities (Ray, 2019). According to Garvey (1979), play has five characteristics: it is enjoyable/fun, it lacks an external purpose, it arises spontaneously and voluntarily, it involves active engagement from participants, and it includes imaginative elements. Play is a voluntary act or activity, freely consented to but carried out within the limits of time and space by strictly prescriptive rules, having an end in itself, accompanied by a sense of tension and joy and a consciousness of 'being different' from 'ordinary life' (Huizinga, 2020). The idea of play is, in our consciousness,

the opposite of the idea of seriousness, but Huizinga (2020), while demonstrating that play is one of the fundamental characteristics of man, reveals the culture-creating function of the same play and, most importantly, convincingly rejects the play-seriousness opposition. According to him, the act of play can be extremely serious and play is a phenomenon that can be observed by everyone. It encompasses both the animal kingdom and the human kingdom at the same time. Consequently, it cannot be grounded in any rational relationship. That is, play cannot be restricted to the human realm. Every thinking being can conceive of the fact of play and play as something independent, even if its language lacks the general term to describe play and play. Children and animals play because they enjoy playing; this is precisely where their freedom lies (Huizinga, 2020).

According to Jean Piaget's studies on cognitive development and play, and Lev Vygotsky's research on social development and play, the types of plays commonly emphasized in early childhood development significantly contribute to children's cognitive, social, emotional, and physical development. The definition of play can be misleading due to its various forms. Children have the opportunity to display new and unexpected behaviors in play that they would not be able to do under pressure (Bruner, 1960). The importance of play for children's well-being has been recognized by the Convention on the Rights of the Child since 1989. Play offers children a safe space to try out new behaviors and ideas without the pressure of real-world consequences and encourages flexibility and innovation (Bruner, 1972; Uluğ, 2014).

Play, which is a serious activity, increases children's creative potential by providing them with opportunities to explore, imagine and create (Huizinga, 2020). The theories of leading developmental psychologists such as Vygotsky (1966) and Piaget (1951) emphasize the importance of play in nurturing imagination and creative thinking. In addition, according to Bruner (1960), play is an effort for children to visualize and interpret events and objects in different ways. Play protects children from real-world conditions and gives them the opportunity to examine different possibilities. Play also develops children's creativity and multidimensional thinking skills (Önder, 2017). Bateson and Martin (2013) emphasize that creativity in children is often expressed through play and that the most creative individuals tend to be playful. According to Bateson and Martin (2013), most of the differences between people stem from what

happened to them when they were young. Therefore, childhood play has a great impact on adult behavior. The most creative individuals usually have a well-developed playfulness. It is important to explore specific types of play that support and develop creativity in early childhood, to provide practical insights into how these types of play can be integrated into early education, and to encourage a creative and innovative mindset from an early age (Fox and Schirmacher, 2014). Considering that children in the 3-6 age group spend most of their time indoors in kindergartens, it is possible to say that kindergartens are the most suitable environments for them to play.

Early childhood is widely recognized as a critical period for cognitive and socioemotional development (URL 1). A critical aspect of development in early childhood that provides the foundation for creativity, problem solving, critical thinking, and cognitive flexibility is play. Bateson and Martin (2013) argue that childhood play and playfulness are potentially important in making adults more creative. Play plays a central role in early childhood, and the types of play that children engage in during this period can significantly impact their creative abilities. Play can take many forms, especially in children. Therefore, it is debated whether some types of play are more important than others in influencing creativity (Bateson and Martin, 2013). According to Bateson and Martin (2013), who discussed the role of play in education, play can manifest itself in many different ways in people. It can have characteristics such as solitary, social, imitative, imaginative, symbolic, verbal, socio-dramatic, constructive, destructive, and manipulative. In addition, free play, dramatic play and art activities have an important place among preschool play types that develop creativity (URL 1). Fox and Schirmacher (2014) divided the types of play that can be played indoors and outdoors into 5 groups as physical play, construction play, dramatic play, competitive play and play with natural materials. One of these, the Play with Natural Materials type, has an emotionally rich and calming feature. It can be carried out with sensory and tactile materials such as water, wet or dry sand, hard and soft materials or with natural materials such as stones and flower petals. In addition, participating in art and craft activities such as drawing, painting and sculpting and producing by experimenting with different materials allows children to express their creativity and develop their fine motor skills (Eckhoff, 2011). According to Bruno Munari (2017), both art and play are fundamental for the holistic development of

children. These activities provide children with opportunities to experiment with colors, shapes and textures, to develop their aesthetic appreciation and confidence in their creative abilities. In addition, it supports critical thinking and problem-solving skills (Munari, 2017). Jean Piaget's theory of cognitive development (1962) and Lev Vygotsky's (1966) theory of social development explain the importance of creative play. As Vygotsky (1966) emphasized, play is very important in terms of mental development, stimulating imagination and abstract thinking.

Cognitive theories focus on how our mental processes or information systems change over time. It is very important to understand the relationship between play and creativity in order to support children's cognitive and emotional development and to define the interaction between the child and the environment (Piaget, 1952). Because the positive findings that creativity can be developed with appropriate and correct educational environments, appropriate materials and creative methods are similar all over the world (Orhon, 2014). Children are born with a series of physical, cognitive, language, social and emotional abilities that enable them to establish social relationships, learn and develop. However, in order for these abilities to turn into permanent behaviors, they need to be recognized and supported from an early age. Unsupported abilities may disappear over time (Karoğlu and Ünüvar, 2017). The tendencies or behaviors that children exhibit in line with their natural curiosity allow them to gain experiences in the areas of cognitive, language, physical, psychomotor development as well as social and emotional development. Providing children with experience opportunities that support all areas of development is vital for both the child and society. Eventually, the child's curiosity will turn into the curiosity of the adult and the artist (Sperati, 2010).

2.3. Exploring Creativity with Play Through Art

Beetlestone (1998) states that creativity and art are closely related to each other and emphasises that children need to own the process and the product in order to be motivated. Creativity in early childhood education is profoundly linked to the interplay of art and play. In the context of art, the theory of play was first articulated by Friedrich Schiller within a broad framework. It is widely accepted that there is a close connection between

play and art, as both activities aim to alleviate daily tensions and bring simple happiness. According to Schiller (1965) a person is fully human as long as he/she plays. A child who engages in play does so purely for the pleasure it brings, similar to the way they might engage in art for the joy of creation. For a child engaged in play, there is no other goal or world beyond the play itself; the child plays simply for the sake of playing. According to this view, artistic activity should be evaluated as a form of play. (Yıldız Turan, 2019).

Schiller's concept of the play drive helps explain this connection, as it mediates between the sense drive, which seeks change, and the form drive, which seeks stability, thereby facilitating a creative balance (Schiller, 1965). The play drive mediates the demands of the sense and the form drive.

"The sense drive demands that there shall be change and that time shall have a content; the form drive demands that time shall be annulled and that there shall be no change. That drive, therefore, in which both others work in concert is the play drive, reconciling becoming with absolute being and change with identity" (Schiller, 1965).

For the play drive to successfully mediate the two drives, human beings must learn passivity, to exercise their sense drive and become receptive of the world. They must also learn activity, to free their reason, as much as possible from the receptive. Accomplishing both, human beings are able to have a twofold experience simultaneously, "in which he was to be at once conscious of his freedom and sensible of his existence, were at one and the same time, to feel himself matter and come to know himself as mind" (Schiller, 1965). According to Schiller (1965), Piaget (1952), Vygotsky (1978), and Huizinga (2020) there is a close link between play and art. The main reason for this is that they embody the same goal. Both make individuals get rid of the daily tensions and give happiness in simple terms. A child who is playing games does it just for the sake of getting pleasure, not something else. Thus, it is better to regard art work as playing games (Yıldız Turan, 2019). Art and play share the ability to engage children in creative and imaginative activities that stimulate their cognitive, emotional, and social development. According to Vygotsky (1966), play is essential for the development of higher mental functions, and when children engage in art, they explore new ideas and perspectives, similar to the way they experiment and explore in play. Piaget (1951) also emphasized the importance of play in

the cognitive development of children, suggesting that through play, children assimilate and accommodate new knowledge, which is also a process inherent in creating art.

To support educational activities, children need free work environments and tools to develop their imagination. The art corner serves these purposes. The art corner which is in most preschool programs, art activities are frequently used. Artistic works are elements that provide clues about the physical and social environments in which emotional and visual elements can be expressed. The emotions that children choose to express may arise directly from their immediate environment or indirectly from the experiences they hear and see. What truly interests children is not the product but the experimental process they experience. This space is a center of music and movement. Furthermore, it is a center where children's emotional development is supported. In the art corner, children have the opportunity to express their skills. Additionally, these activities have a therapeutic function and provide skills and confidence to children. In this area, there should be enough workspaces to allow two or more children to work comfortably, and furniture and tools made of natural washable materials, where activities such as painting, printing, collage, modeling, gluing, painting can be easily carried out. Additionally, it is very important to have a space where the works can be displayed. In this way, the approval and appreciation that children will receive will support their emotional development (Sanoff, 1995).

2.4. Designing a Playful Learning Environment for Children

The physical environment, which is a living and changing system, determines how time is used and what roles we should play. It affects the quality of our lives while simultaneously conditioning how we feel, produce, and behave (Greenman, 1998). The environment has a great impact on creativity. Environmental factors nurture or hinder creativity (Öncü, 1992). The creativity of a child growing up in the necessary environmental conditions develops positively (Guilford, 1986). Therefore, certain environments should be provided for creativity to emerge and develop. Considering that children acquire most of their experiences and skills through play, it has been found that playful children are more creative (Lieberman, 1977). The role of play in education has

occupied many authors with different backgrounds for many years. In early childhood, environments that are rich in stimuli, that evoke a sense of discovery and that provide confidence in self-expression have a positive effect on creativity (Kontaş, 2015). Preschool education structures are one of the environments that provide this (Bilgiç and Surur, 2016). First of all, every game is voluntary and action-oriented. A game that is subject to orders is not a game. Therefore, the first basic line of play emerges here: Play is free and freedom (Huizinga, 2020). Children can play anywhere, anytime. For children, the place where they play is as important as the game (Stine, 1997). What is even more striking than the temporal limitation of play is its spatial limitation. Every game, whether material or imaginary, arbitrary or compulsory, takes place within the boundaries of its predetermined spatial area (Huizinga, 2020). Therefore, there is a certain and absolute order within the boundaries of the playground. According to Huizinga (2020), these are temporary worlds in the middle of the familiar world and are designed for the performance of a certain action.

Children spend a large part of their lives at school. When this is taken into account, the school becomes a place that the child adopts and feels more like home (Bilgiç and Surur, 2016). Play takes place within this framework where the rules are valid. The delimitation of a separate area is also the first characteristic of every sacred action. Therefore, this sacred play area is the area where the child feels at home (Huizinga, 2020). The value of creating a playful learning environment is increasingly emphasized by many authors (Bilgiç and Surur, 2016). Among the formal characteristics of play, the most important is the spatial separation of action from daily life. In educational environments, designing areas that facilitate both art and play by providing flexible areas, various materials, and opportunities for open-ended activities can significantly enhance the learning experience (Olds, 2001). As a result, the integration of natural elements and artistic decorations can create an inspiring and stimulating environment and encourage children to explore and create more (Hertzberger, 2008).

Preschool play areas are divided into three general categories in terms of functional requirements: active play, quiet play, and messy play. Given the nature of the activities, the category that is particularly suitable for art and play is the Messy Zone. The presence

of sensory materials as well as craft and painting tools creates an environment that supports a wide range of creative and hands-on learning experiences. The flexibility, adaptability, and accessibility of the Messy Zone make it an ideal space to encourage artistic expression and playful exploration, which are essential components of early childhood education. The Messy Zone is a critical area in preschool settings where a variety of activities take place, typically involving tables and chairs, easels, woodworking benches, and water, sand, and clay tables. Children typically move freely in these areas and make frequent trips to the sink. Ideally, the Messy Zone should also be connected to an outdoor play area that increases the range of activities that children can participate in. These facilities should be arranged in close proximity to each other for accessibility between different activities. This usually covers a significant part of the space with defined boundaries and requires a washable floor surface covering about half of it (Olds, 2001).

As a result, play, art and sensory activities are very important to develop children's creativity and aesthetic qualities in their play. Children get to know the outside world through play, gain experiences through play and reveal their creative powers through play. The basic condition for these activities to develop the child's creativity and aesthetic qualities is that the child's educational environment feeling comfortable and free (Yalçın, 2011; Huizinga, 2020).

3. EARLY CHILDHOOD EDUCATION

3.1. Overview on Early Childhood Education

“The principal goal of education in the schools should be creating men and women who are capable of doing new things, not simply repeating what other generations have done; men and women who are creative, inventive and discoverers, who can be critical and verify, and not accept, everything they are offered.”

Jean Piaget

Educational institutions represent the primary social environments where children first engage with societal structures. In the context of early childhood education, 'nurseries' and 'kindergartens' are the most commonly recognized settings. The term kindergarten which originally derived from the notion of the school as a metaphorical garden, alludes to children as unfolding plants, being nourished and nurtured with care and love in a plant house or a nursery. Along with this are biblical allusions to the lost innocence of Adam and Eve in the Garden of Eden. The German educational pioneer Friedrich Froebel (1782-1852) almost certainly invented the term; he imbued the kindergarten idea with a faintly mystical quality believing it to be a symbolic representation of nature, a sort of microcosm of the world, reflecting the positive aspects of a different environments (Dudek, 2007). Education has an important role in the development of countries both culturally and financially. For this reason, if political, economic and social developments are expected in a country, the issue of education should be addressed first (Orhon,2014).

The first Article of the United Nations Convention on the Rights of the Child, which is the most widely accepted by the countries of the world, is related to the definition of childhood and states that every individual is considered a child until the age of eighteen (URL 2). Early childhood is a critical developmental phase that spans from birth to approximately eight years old. This period includes the preschool years, which are

essential for cognitive, social, and emotional development. According to the World Health Organization (URL 3), early childhood encompasses several stages, including infancy, toddlerhood, and the early school years, each contributing uniquely to a child's overall growth and learning potential (URL 3). While the term "early childhood" broadly encompasses birth to eight years, focusing on the preschool years allows for a more precise examination of the developmental milestones and educational interventions relevant to this age group (Bodrova and Leong, 2007). Research has shown that preschool children benefit significantly from play-based learning environments that stimulate their imagination and problem-solving abilities (Bodrova and Leong, 2007). Preschool education, typically involving children aged three to five, is a subset of early childhood that focuses intensively on foundational skills and behaviours that set the stage for lifelong learning. These formative years are marked by rapid brain development, making it an ideal time to encourage exploratory and creative activities that support cognitive flexibility and innovation. In addition, the pre-school period, which covers the period between the ages of 0-6, also called Early Childhood, is the period in which many developmental experiences and skills are acquired (Bloom, 1984). In the context of encouraging creativity in early childhood education, it is crucial to distinguish the specific age group being targeted.

Preschool education is the education process called "Early Childhood Age", which covers the period between 0-72 months from the birth of the child until the time the child starts primary school and includes the most important periods of development after the prenatal period. The main purpose of education in the 0-6 age period is to ensure the mental, spiritual, physical and social development of children in this age group; to take the necessary precautions in terms of care, shelter, health and nutrition and to ensure that they are ready for the school period by maintaining them in a planned and systematic manner (Bilgiç and Surur, 2016). Preschool years, which cover the period between 0-6 years, are one of the most critical periods of life due to their impact on the formation and shaping of personality, acquisition and development of basic knowledge, skills and habits. The basic knowledge, skills and habits to be acquired through the experiences provided to the child at an early age have the power to shape the child's later life as well as his/her social and emotional life. Preschool education service, which should be guided by a serious,

scientific and systematic organisation that cannot be left to coincidence, is the most crucial step of the whole education system (Ari, 2003). The first years of life are critical for later outcomes. Early childhood ages have an innate desire to learn. That desire can be supported or undermined by early experiences. High-quality early childhood education can promote intellectual, language, physical, social, and emotional development, creating school readiness and building a foundation for later academic and social competence. Bruner (1977) argues that preschool children learn through personal experiences. If skills such as creative thinking and problem-solving develop in some parts of the brain, education should be a process that aims to make these regions work in a practical sense (Orhon, 2014). Torrance (1962) states that one of the obligatory duties of educators is to ensure that preschoolers make positive contributions to society. This is related to the ethical nature of education. The sustainability of civilization is closely linked to the creative imagination of young generations. The period of the child up to the age of 6 is very important because it is an age in which learning and development take place intensively and the main habits of the child are established (Bilgiç and Surur, 2016). In addition, the child's confidence in the environment in which he/she is in and feeling free is important in the development of creativity (Yuvacı, 2017).

Children spend a large part of their lives at school. Considering this, the school becomes a place that the child adopts and feels more at home than their actual home (Bilgiç and Surur, 2016). Preschool education structures are one of the environments that enable this. In a traditional education system, elements such as lessons, curricula, assignments, class schedules, and similar components are organized without regard to the child's interests and needs (Kafadar, 2016). In this model, the curriculum and the teacher are prioritized. In classical schools dominated by traditional disciplinary approaches, students are expected to exhibit unconditional compliance in all situations. Since traditional education generally does not involve active experiences, learning becomes difficult, and what is learned can be forgotten in a short time. To prevent such negativities, children, who are the active elements of the learning centre, should be at the centre of education and training activities, and contemporary approaches should be applied accordingly. Considering the developmental characteristics of children in the early years and the outcomes of the

traditional education approach, it has been seen that it is important for children to be in an environment with rich and abundant stimuli.

3.2. Contemporary Educational Approaches

Altomonte (2014) notes that between the last decades of the 19th century and the first decades of the 20th century, we witnessed a renewal of childcare teaching in line with a strong anti-semanticism and at the same time a new respect for children's spontaneity. Proponents of this movement, called *new schools*³, include Adolphe Ferrière, Maria Montessori, Giuseppe Lombardo Radice and others. Creating an environment where creative thinking can be developed in all areas of human intelligence should be the primary role of education. It should also encourage the use of these abilities. Such encouragement cannot be provided only by teaching. It should also be supported by creating a flexible environment where creative potential can be demonstrated and fully utilized at every stage of life (Torrance, 1962). Creative skills are easily discovered in early childhood. However, over time, creative thinking may disappear because it is not reinforced or inhibited (Fyle, 1985). For these reasons, families and schools play a major role in creativity. If children are guided correctly without being restricted, they are more likely to become creative individuals who can express themselves. Preschool and the first years of primary school are suitable periods for children with a certain creativity potential to develop and use this potential (Bessis-Jaqui, 1973). The flexibility of the teacher is one of the important factors that develop creativity in the classroom environment. Flexible teachers support the cognitive development of students by creating problems in the classroom where there is no single right answer. Thus, they allow students to find different solutions independently (Cornish, 1989). Knowing and determining the creativity levels of children according to their developmental periods and ages can facilitate the preparation of appropriate programs for them.

The educational environment includes the presence of everyone living, working and playing in it, even if they are not there. They make their presence felt through the drawings, sculptures, words, numbers or clay works they use to express their ideas

³ *Ecoles nouvelles*

(Cadwell, 2003). If the environment is comfortable, happy, clean, tidy and attractive, it is a very valuable teacher. As the third teacher, the environment has many types such as large and small areas or areas for dancing, talking, thinking and walking around. There are areas for creating, exploring and working with different materials, as well as areas for small and large groups. In these areas, teachers and students can think, design and work together without distractions. Every area and every corner of every area has an identity and purpose for both children and adults. (Cadwell, 2003). According to Duke (1998), learning can take place anywhere. However, not every educational area is designed to serve its purposes effectively. In traditional education, educational areas are usually designed assuming that all children have the same characteristics. Each child has different learning abilities. For this reason, educational structures should offer spatial diversity in order to respond to children's different learning abilities. In this context, the built environment should also be considered as an educational element. According to Rinaldi (2006), the structure and organization of the environment should enable children to realize their potential, talents and curiosities. He summarized the function of the environment for children as follows:

- i. It should provide children with a space where they can conduct research on their own and with other children or adults;
- ii. It should allow children to feel like leaders in their projects and educational abilities;
- iii. It should play a role in their personal development, including sexual identity, independence and security.
- iv. It should provide the opportunity to work and communicate with others;
- v. It should make them feel that their identities and private spaces are respected.

In traditional education, learning often becomes difficult and short-lived because active experiences are generally absent. To prevent these drawbacks, it has become prominent to place children, the active elements of the learning center, at the heart of educational activities and implement alternative approaches accordingly. Considering the developmental characteristics of children and the outcomes of traditional education in early years, it is evident that children need to be in a rich and stimulating environment.

According to Dudek (2007), because the schedule is expressed primarily as a series of quasi-functional zones underpinned by a predetermined floor area relating to child numbers, the architectural narrative tends to be two-dimensional and very limited. There is an emphasis on a prescriptive approach where rules and regulations guide the architectural strategy. Everything is very much pre-determined by the zones or territories which are strictly imposed upon children. The main determinant of the architecture are age-related groupings. In contemporary educational approaches, however, children of different age groups work together and learn from each other.

The sensory and aesthetic qualities of objects around us are a powerful tool for children to explore the world and build their sensory systems (Sternberg 2009). In this context, some educational approaches to learning refer to both the body and the five senses. They also emphasize the need to activate the sensory aspects of education and to give importance to creativity. These educational approaches are Dewey, Waldorf, Fröbel, Montessori and Reggio Emilia, which emphasize sensory learning to varying degrees. However, Dewey, Waldorf and Fröbel do not completely exclude sensory learning in their educational models. However, although each of them emphasizes sensory learning, it does not play a strong, effective and central role as in the Italian school Montessori and Reggio Emilia approaches. Of these approaches, the Italian Montessori and Reggio Emilia approaches play a more central and fundamental role in education for sensory experience. For example, Montessori spaces activate all five senses through natural materials and spatial arrangements that encourage children's independence, and the spaces are specifically designed to create learning experiences in this direction. Bruno Munari, a pioneer in art education in Italy, shares this view, emphasizing creativity and sensory exploration as the key to developing children's independence and originality. For Munari, artistic expression is not simply reproduction, but rather requires independence to create something original. His approach is in line with Montessori's philosophy of 'Let children do it for themselves'⁴, and emphasizes the importance of environments where children can experiment and discover on their own (Fujita, 2022)

⁴ Aiutiamoli a fare da soli

In that point, Montessori and Reggio Emilia Italian Approaches are often described using several terms, each emphasizing a different aspect of the learning approach. Both Montessori and Reggio Emilia methods emphasize child-centered learning and creativity. The Reggio Emilia approach is particularly known for its focus on creative expression through what is termed "a hundred languages," encouraging children to communicate and explore their ideas through various forms of art and materials (İnan, 2017). Similarly, the Montessori method supports creativity by providing a prepared environment that encourages children to engage with materials that foster imaginative play and self-directed learning. Montessori space design is organised to create a learning experience that supports the five senses. Natural materials, elements that provide sensory enrichment and spatial arrangements that encourage children's independence embody. In both approaches' understanding of sensory education in spacial design and the environment is considered a crucial element of the learning process. The Montessori environment is meticulously prepared with specific materials that support independent learning. Reggio Emilia refers to the environment as the "third teacher" emphasizing the design of spaces that foster exploration, creativity, and interaction among children. As an educator, the environment also has something to say (İnan, 2017; Cadwell, 2003). In Montessori, teachers observe and guide children individually, offering support as needed while allowing for self-directed learning. Reggio Emilia teachers act as co-learners and collaborators, engaging with children in the learning process and often working alongside them on projects (İnan,2017). While the Montessori and Reggio Emilia approaches share many common features, they also differ in key aspects, as summarized in Table 3.1. (Cadwell, 2003; Ceppi and Zini, 1998; Rinaldi, 2006).

Table 3.1. Differences between two educational approaches

MONTESSORI	REGGIO EMILIA
Parental involvement is underestimated	Advocates that parents should always be a part of education
Individual experiences are of primary importance in the formation of personality	The ‘environment’ (social and physical) is of primary importance in the formation of personality.

In the Montessori approach, there are certificate programmes. For this reason, it is easier to be applied in different cultures and countries.	It differs according to each culture, so it is not understood immediately, it is assimilated over time. Teachers cannot become teachers of Reggio Emilia schools with a training, a process of understanding the philosophy is required.
There is a curriculum followed in Montessori. That curriculum is applied according to the different developmental aspects of each student. The teacher is both a follower and a leader.	The Reggio Emilia Approach has a flexible programme that can change according to the students. The student manages the process
There are more ordinary places that can be called simple, calm and peaceful.	There is an environment in constant motion. Sound, light, movement, colour, nature and food smells are part of the environment.
There are certain play materials prepared by Maria Montessori.	Play materials are mostly informal (unstructured) toys; unpainted wooden blocks, materials collected from nature, clean recycled materials
It is result orientated.	The process and contributions of education are important, not the outcome

Both methods are child-centered, but they apply this principle in different ways. Montessori is a method that uses materials and activities that children can choose according to their interests and developmental stages. In contrast, Reggio Emilia is a method that focuses on curriculum that often evolves based on children's ongoing projects and investigations.

3.2.1. Reggio Emilia Approach

Reggio Emilia is an educational system approach that is the centre of attention for early childhood educators worldwide. The Reggio Emilia approach has brought a new perspective to education as an early childhood education approach. According to the philosophy of the Reggio Method, the world should not be simplified, but should be experienced by adults and children in all its complex beauty (Cadwell, 2003). One of the many factors that make the Reggio Emilia Approach, which has inspired many early childhood educators around the world, special is the value it places on the child and the child's learning environment, that is, the physical, social/emotional environment (İnan, 2017). The Reggio Emilia approach is influenced by the educational views of thinkers such as J. Dewey, J. Rousseau, H. Pestalozzi, F.W.A. Froebel and M. Montessori. The development of the Reggio Emilia Approach over time began in the mid-nineteenth century and has progressed through numerous significant milestones. This long timeline, leading to the present day, has brought Reggio Emilia and the Reggio Emilia Approach into contact with more than 145 countries and territories around the world (İnan, 2017). It has been used in the laboratory kindergartens of many advanced research and educational universities such as Harvard University (İnan, 2017).

Preschool children regularly use scientific process skills such as estimation, observation, measurement/calculation, comparison, classification/categorization, data collection/recording, communication, and interpretation. Materials such as overhead projectors, computers, various types of paper, waste materials, mirrors, light sources, various trees, leaves, branches, dried plants, wire, clay, and more help children bring their projects to life. These range from stop-motion films created by capturing the movement of 3D static objects frame by frame or animations where drawings are arranged to move according to a scenario, to clay sculptures, water pools with fountains for birds, the construction of a meter unit, or creating habitats for living creatures on sidewalks. By using various materials and technological tools, children deeply explore subjects they are

curious about and express their findings through diverse forms of art and other means (Malaguzzi, 1998).

In other words, children engage in extended projects that often span several days in schools. Art takes a central role in these projects, not with the aim of producing superior art products, but as a means to support children's thoughts and self-expression. Art plays a prominent role in these projects; however, producing high-quality art is not the primary goal. Instead, art is used as a tool to support children's thinking and self-expression children study how different plants absorb water as seen below in Figure 3.1.



Figure 3.1 In a Reggio Emilia-inspired workshop Plants project - Light table (URL2)

In the workshops, art serves as a tool to emphasize social unity and integrity, "I am us"⁵. In addition, science (science/nature), scientific process and technology play an important role in Reggio Emilia projects. The child's curiosity determines the topics explored and guides the educational content. Even seemingly marginal or unimportant details are considered valuable. Because curiosity and experiences are very valuable. The Reggio Emilia Approach is based on many theories, especially Jean Piaget's (1951) theory of cognitive development (constructivist) and Lev Vygotsky's (1966) socio-cultural theory (social-constructivist). It advocates curiosity-based project studies that emerge and develop and change over time, showing cultural characteristics (İnan, 2017).

⁵ Io Chi Siamo

In the Reggio Emilia Approach, children are thought to be born with a genetic capacity. This capacity allows children to conduct intensive research, distinguish and interpret using all their organs. As neurobiological research has pointed out, the senses are in individual and group memory to structure and use knowledge. However, environmental designs that do not stimulate and encourage the individual to do something, cause children's perspectives to remain undeveloped. Research also supports this to be true even for very young children. Therefore, it is imperative that schools support and nourish the senses (Ceppi and Zini, 1998). Therefore, the role of the environment is important in Reggio Emilia. In Reggio Emilia schools, the environment is considered the 'third teacher', where sensory-rich experiences are an integral part.

The physical environment, which is usually absent in other schools, is a clearly visible area in Reggio Emilia schools (Vecchi, 2010). All of the Reggio projects include a definitive pedagogical system. They create children's spaces that allow aesthetics to be reflected in the interior architecture. This treats architecture as the background of children and their activities. It is an environment that provides a balance between social and private spaces for children in a coherent architectural style (Dudek, 2007). The interior and exterior spaces of Reggio Emilia's infant-toddler centers and preschools are designed and organized in interconnected ways, offering opportunities for living and researching together with children and adults. For instance, as shown in Figure 3.2, the building located in a forested area in Stockholm is designed to integrate with its natural surroundings. Large glass facades provide unobstructed views of the garden, allowing children to closely observe and connect with nature.



Figure 3.2 Tellus Nursery school architecture: integration with nature, Stockholm (URL3)

Ceppi and Zini (1998) stated that the environment in Reggio Emilia schools differs from the traditional classroom environment in several ways. These are:

- i. It is a relaxed, flexible, liveable, diverse, soft environment that can offer an individual-private space from which children can escape when necessary, encouraging respect for others and listening to others.
- ii. There is a connection and relationship orientated environment through observing, reading, studying and interpreting facts and presenting these facts in an informed way.
- iii. It not only connects with the outside, i.e. with the city, through activities and routine work, but is also a kind of osmosis, a microorganism of society, because it is the environment in which many of the city's characteristics and the city's activities are contained.
- iv. Since it has a multisensory character, there is an environment with a rich infrastructure that allows children to have emotional experiences for the development of personality, the structuring of knowledge and the realisation of differences between parts. Being a living organism, the environment changes, reacts, i.e. responds to the Individual, is customisable, flexible and evolves according to the learning process and pace of the children (Figure 3.3).
- v. Community consciousness is dominant. There are shared values, common goals, a participatory spirit. In other words, the environment enables the three protagonists (teacher, child, parent) to have a say in the educational process.
- vi. The environment has a constructivist conception, i.e. it exhibits a complete understanding of development in accordance with the social-constructivist conception for experimentation, research, individual and group experiences, not a straight development, but a spiral development, sometimes structuring, sometimes disrupting, reconstructing;
- vii. Reggio Emilia schools care not only about the results and products of children's work, but also about the processes of learning and knowledge construction. They make various presentations such as holograms documenting these processes.

- viii. The environment has a kind of psychic layer that animates it. This layer consists of writings, shapes, objects, materials, colours, pictures, which make their presence felt even in the absence of children. And finally, the environment is an environment where contrasts and contradictions are consciously managed, where the desired balance is achieved, calm, non-violent, simple but carefully planned, full of different elements and relaxing tones, including all colours.

Every space is a potential area for learning and development. Dudek emphasizes the importance of certain elements that contribute to the success of early years centers. These include light, color, use of materials, smell, sound, quality of environmental conditions and variability, which can be transformed by users throughout the year. This philosophy advocates spaces for early childhood education environments that respond to and support the developmental needs of young children. The criteria for the design of the physical space that will be needed in the Reggio Emilia education approach are grouped under the titles (Bilgiç and Surur, 2016):

- i. Common space fiction
- ii. Flexible space fiction
- iii. Ergonomics
- iv. Natural light requirement
- v. Space-user communication
- vi. Space-colour-shape communication
- vii. Reflection-space communication

Each of these titles defined as design criteria is in constant interaction and communication with the other as seen in the figure below. In this approach, the environment, and therefore the spaces and equipment that create this environment, are considered as an educational tool (Figure 3.3).



Figure 3.3 Example of a workshop from the Loris Malaguzzi international centre in Reggio Emilia, Italy (URL4)

Figure 3.3 demonstrates how the design elements of early childhood education spaces, such as light, color, and flexibility, are integrated to create a dynamic learning environment. These spaces are not only functional but also act as educational tools, supporting the Reggio Emilia philosophy of participatory education. Since the environment is considered the third educator in the Reggio Emilia Educational Approach, another principle of the approach, "flexible space concept," has been recognized as fundamental to environmental design. The flexible space concept, which can be described as "the same space being used for different functions at different times," is achieved through the design of equipment that can be continuously rearranged for activities involving parents. Classrooms designed with a flexibility incorporate various areas such as art, writing, reading, sandbox, water pool, mathematics, handicrafts, science, home-related function training, or drama plays (Bennet, 2001). This flexible space concept is exemplified in the architectural plan of Tellus Kindergarten (Figure 3.4). It allows for functional and common spaces that support a variety of activities.



Figure 3.4 Tellus Nursery School Plan, Stockholm (URL5)

Another remarkable part of Reggio Emilia school is the hall where all the rooms open up, which is remarkable in common schools. As shown in Figure 3.5, the vibrant colours and natural lighting used in Tellus Kindergarten support Reggio Emilia's philosophy that prioritises children's senses. They are also elements that create a sensory-rich learning environment. The Piazza, a central hall where students work together on projects, workshops and presentations, emphasises interaction and creativity. In the piazza, children from different grades are organised in an area, and it is here that they realise big projects (Malaguzzi, 1998). The Reggio Emilia model sees children's sensory experiences as a fundamental part of the learning process. Through the active use of the senses, children explore and make sense of their environment and create their own learning paths. In this respect, sensory education is fully in line with the Reggio Emilia philosophy.



Figure 3.5. Tellus Nursery School's Classroom and Common Hall (Piazza) are designed with natural light and contrasting colours with features such as common space fiction, flexible space fiction, space-colour-shape communication. (URL 6)

3.2.2. Montessori Approach

Montessori method is an educational approach developed by Maria Montessori (1870-1952), an Italian physician and educator. Montessori, who based her educational philosophy on individual, self-directed activity and child-centred approach, not only developed new educational materials in her studies, but also produced design and organisation concepts for children's educational environments (Orem, 1974). Montessori believes that every child has the ability to become an independent individual through active discovery and learning processes from the moment of birth. The method, which allows children to decide what they want to do, generally transforms abstract knowledge into concrete knowledge that children can easily apply in practice, and emphasises the need for schools to be accessible in order for educational institutions to be more involved in life. Montessori education is characterised by its emphasis on independence, freedom within limits and the natural psychological development of the child (Herztberger, 2008).

Montessori education is based on the principle that young children learn in a way that is fundamentally different from the way adults learn. The programme is oriented towards how young children grow and the multiplicity of their learning capacities at a young age. This helps children to start actions and to be free to choose the actions they like. Young children learn how to take part in specific actions by observing or imitating their older friends. Together with the educational programme, children enter into a self-correcting

process, as the design of the educational materials provides specific lessons (Sanoff, 1995).

Elena Bazzanini's article (2013) '*Arte e infanzia*' also identifies Munari and Malaguzzi as pioneers of approaches to artistic education in late 20th century Italy. "Two figures of great humanitarian value and international fame can be recalled here. They were the first to introduce the concept of art for children. They are the pedagogue and psychologist Lauris Malaguzzi and the artist and designer Bruno Munari. Munari as the latter should be recognised as the pioneer who conducted the first workshop for children in a museum (Brera Picture Gallery, Milan, 1977) and Malaguzzi as the former and the pioneer who initiated workshops in workshops and children's schools (Bazzanini, 2013). The Montessori method, the prevalence and effectiveness of which is unquestionably accepted by all educational scientists all over the world. According to Maria Montessori, since the education of the senses is as important as movement in the education of the child, sensory studies have an important place in the essence of the method. The educational materials are arranged in a way to enable the child to understand concepts such as form, size, colour, texture, taste and the relationships between them. The basic element of the Montessori approach is to create space. It asserts that the physical freedom of children can be ensured by the vital tools to be provided to them. Children can express and develop themselves in a free environment. Children can help to develop their independence in this free environment. (Demiriz et al., 2011) (Figure 3.6).



Figure 3.6 Maria Montessori School Hampstead, London, United Kingdom (URL7)

Montessori spaces are organized simply and aesthetically. Classrooms are considered bright, airy, and safe. Light colors are used throughout the interior as seen in Figure 3.7. There are pictures and paintings on the walls at a level that children can see. There is an order in Montessori education spaces (Montessori, 2023)



Figure 3.7 Montessori Training Space / Eucalyptus Montessori Child Care Centre in Kambah, Austria - CCJ Architects (URL8)

The location of materials is clear. Children can work freely using the materials they want. In accordance with the children's sizes, the furniture is also light and light in color to provide ease of transport for the children. Chairs, tables, shelves, and all the tools and equipment in the space are thought to be suitable for children's sizes. Cabinets have open shelf systems, sink sizes, door handles, toilets and hangers are designed according to children's heights. In this way, children can move freely as they want and have physical independence. As shown in Figure 3.8., the furniture used in Montessori classrooms is designed to be appropriate for the physical size of the children. This enables children to access materials easily and work independently. For example, cabinets and tables are suitable for children's height and can be easily transported thanks to their lightweight construction. In addition, sofas and armchairs, which children can use comfortably in both individual and group activities, offer an independent learning environment and provide comfort for children. At the same time, areas such as carpets on the floor create an alternative environment where children can work and rest freely, while different textures on the floor contribute to sensory development.



Figure 3.8. Montessori classes (URL9)

This method supports children in learning by doing and experiencing. The child, who is associated with objects specific to daily life, learns by doing real-life tasks. This method has a significant impact on the child's self- confidence gain (Yuceel, 2022). There are many different areas in Montessori education spaces. These are practical life exercises, sensory exercises, mathematics corners, book corners, and cultural activity areas (Demiriz et al., 2011). For instance, the music corner and the working area are divided by the curtain and used in the same area. as seen in Figure 3.9.



Figure 3.9 Different divided activity areas in International Montessori SchoolHof Kleinenberg, St. Stevens-Woluwe, Belgium (URL10)

In image 3.10 below, the relationship and accessibility between indoor and outdoor spaces at the Fuji Montessori School (Tokyo, Japan) is designed to allow for children's exploration and movement, a fundamental principle of the Montessori approach to education. The school's outdoor spaces provide direct access to classrooms, thus

supporting children's continuous interaction with nature. This design approach allows children to connect with the environment and enrich their physical and sensory experiences. At the same time, it allows them to continue their learning process both indoors and outdoors.



Figure 3.10 The relationship and accessibility of indoor and outdoor spaces, Fuji Montessori School, Tokyo-Japan Outdoor (URL 11)

All developmental needs of children are met in Montessori education venues. Each child has the opportunity to observe each other while performing a study or activity in places where they have the freedom to work independently according to their wishes (Yuceel, 2022). According to Montessori, each child exhibits different behavior patterns at different ages and since each of these age groups will be considered as a stage, each age group has unique needs. In order to develop social skills in children, Montessori classes were mixed in terms of age, gender, culture, physical disability, and success.

3.3. Multi-sensorial Learning Environment

All children are born with the creativity ability, but this can be developed by providing an environment that supports creativity and at the same time by training the senses (Fisher, 2005). The development of creativity of every child born with the potential for creative thinking depends on many factors such as personal characteristics, family environment, education, and environmental stimuli (Çetin and Koyuncuoğlu, 2013). Creativity, for Gianni Rodari who was incredibly close to Munari, both in terms of common purpose and professional relations with him (Altomonte, 2014), rests on imagination, which is a capacity common to all men, and can be increased through education. It is necessary that the child can grow in an environment rich in impulses and stimuli, in every direction (Rodari, 1973).

According to Vygotsky (1966), play is essential for the development of higher mental functions, and when children engage in art, they explore new ideas and perspectives akin to their explorations in play. Piaget (1951) also emphasized that through play, children assimilate and accommodate new knowledge, a process inherent in creating art. All children are born with the ability to be creative, but developing this ability requires creating an environment that supports creativity (Fisher, 2005). Having received a literacy-centred education, there are adults and teachers in various schools tend to teach using words and ready-made models, instead of the way children learn, which they discover through direct touch and experimentation. Kindergarten designs should provide experiences that stimulate all of a child's senses (Munari, 1971). Today visual, communicative, and multisensorial experiences have already started in preschools and also playgroups even for 12-36 months old. By integrating these principles into preschool design, educators and designers can create environments that support and enhance children's creative development, in line with Munari's educational philosophy.

In 1921, F.T. Marinetti published the manifesto Tactualism in Paris, with the aim of developing an aesthetic activity based on touch as a means of transmitting the senses, creating 'tactile harmonies for better communication between people', adding that we should avoid as much as possible the use of colour, which distracts attention from the

tactile senses. The artist recalls his intense multi-sensory experience at sea, where he built the first tactile table by combining multi-sensory materials ‘in silky water... between iodine-impregnated seaweed mattresses...’ evoking different sensations and at the same time creating a way of reading (Restelli ,2002). As in every educational institution, there are two sides of the learning environment in preschool education institutions: Psychological and physical. The physical aspect refers to the physical structure of the educational environment, its width, walls, ceiling/floor, windows, lighting system, doors, colours, weaving, richness of materials and furniture, their organisation, design and positioning (Inan, 2017). The psychological aspect refers to the living structure of the learning environment and the social and emotional elements it brings. Using of various sensory experiences to engage children in learning is very important. In kindergarten designs, incorporating different textures, colors, sounds, and smells can enrich children's sensory experiences (Munari, 1997). Learning techniques and different types of students, the environment in which learning is practiced is also of great importance. As can be seen in Figure 3.11, this activity, which is carried out behind the curtain, allows children to experience multiple senses at the same time. Children have a visual, auditory and tactile experience while watching the shadows reflected on the screen. This activity supports the development of skills such as discovery, creativity and sensory awareness through shadow and light play. They can also observe the relationship between children's movements and their shadows and make cause-and-effect relationships.



Figure 3.11 An activity where different senses are experienced at the same time (URL12)

If it is known that learning occurs through experiences acquired through seeing 83%, hearing 11%, sniffing 3.5%, touching 1.5% and tasting 1%. In addition, people remember:

- a. 10% of what they read,
- b. 20% of what they heard,
- c. 30% of what they saw,
- d. 50% of what they saw and heard,
- e. 70% of what they said, and
- f. 90% of what they did and said (Kaya, 2000).

Considering that a space is not only a physical space, but also a gateway to the human interior, shaped by memories, emotions and imagination (Bachelard, 2014), the philosophical exploration of the sense of touch reveals its fundamental role in human experience. As Taylor and colleagues (1973) noted, touch is often considered the "sense of reality." This perspective underscores the importance of tactile experiences, particularly for children, who rely on touch more dominantly than other senses to understand their surroundings.

The child is present with all his/her senses: not only hearing, sight, smell, taste and touch, but also the sense of weight, thermal sensation, sense of balance...: he/she should therefore be helped to expand his/her senses. Multisensory knowledge. Children can be offered educational games and environments that allow them to learn by playing, in order to discover the properties of materials and develop their observation skills (Restelli, 2002). The world outside the individual is explored by intelligence through manipulations and logical operations, in order to try to understand things and phenomena around us. Sight, hearing, touch and all the other sensory receptors are put into action simultaneously and the intelligence tries to coordinate all kinds of sensations in order to realise what is going on (Munari, 2017). Today, apart from Aristotle's five senses, many different and new senses have been identified in scientific studies, such as 'thermal sense', 'sense of weight', 'sense of pain', 'proprioception' and 'space sense', which perceives the position of the body in space. Also included are the 'sense of time' and the 'sense of movement', the ability to predict the outcome of a movement. Perception cannot be reduced to the interpretation of sensory messages alone. Because the brain uses prior

knowledge as well as stimuli. In addition to prior knowledge, emotional factors also have a great influence on perception. Finally, the 'sense of humour' and Rudolf Steiner's concept of the twelve senses, which play an important role in the general well-being and spiritual development of human beings, are among the defined senses (Restelli, 2002).

Many types of architecture can be distinguished according to the sensory mode they emphasise. Besides the dominant eye architecture, there is a tactile architecture that emphasises muscles and skin. There are also architectures that recognise the fields of hearing, smell and taste (Pallasmaa, 2016). Every expressive experience of architecture is a multisensory experience; the eye, ear, nose, skin, tongue, skeleton and muscle each have an equal share in the measurement of qualities related to space, matter and scale. The existential experience of architecture strengthens one's sense of being in the world, and this is essentially an empowered experience of self. For this reason, architecture also includes many areas of sensory experience that interact and intersect with each other, rather than just sight or the classical five senses (Pallasmaa, 2016). In this context, when we consider the methodology of Bruno Munari, an influential Italian artist and designer, it is seen that Munari has a significant influence on creative educational approaches such as Montessori and Reggio Emilia (Bazzanini, 2013; Fujita, 2022). Malaguzzi and Bruno Munari are considered pioneers of artistic approaches in education in Italy. Munari's work emphasizes the importance of creativity, play and discovery in learning. This is closely related to the principles of educational methods.

4. BRUNO MUNARI: EDUCATIONAL PHILOSOPHY AND HIS ADVOCACY FOR CREATIVITY

“For years schools have spent hours explaining and explaining things that can be understood at a glance, but (if the visual explanation is done well) verbal explanations are not necessary.”

Bruno Munari

Advocates of creative approaches in education, such as Bruno Munari aim to create flexible and inspiring learning environments where children can freely express themselves and develop their creative thinking skills through play and art. Bruno Munari’s approach to integrating art and play in educational settings provides a practical framework for fostering creativity. His workshops emphasize the use of various materials and multi-sensory experiences, allowing children to experiment freely and express themselves without the constraints of predefined outcomes. Munari believed that both art and play are fundamental to the holistic development of children, promoting not only creativity but also critical thinking and problem-solving skills (Munari, 2017).

Creativity, which is necessary for better coping with stress or difficult problems, must be acquired in the education system (Torrance, 1962). Many educators argue that instead of using traditional education methods, namely direct instruction, to load information onto children, it is essential to create rich environments where children can construct knowledge themselves. These environments should be strengthened through human relationships (İnan, 2017). In this context, Bruno Munari's pedagogical approaches that promote design, art, and creativity can be associated with specific educational philosophies and methods. However, some approaches may be more directly connected to Munari's philosophy. It can be argued that Munari's work is particularly closely related to the Reggio Emilia and Montessori approaches. In his book *Fantasia* (Munari, 2017), published in 1977, Munari reflects on creativity and treats it as one of the most important human qualities. Creative individuals are constantly evolving and their creative potential

stems from the fact that they are constantly acquiring new knowledge and expanding their knowledge in all fields. Munari strongly emphasised the importance of the development of the creative human being and at the same time he thought of specific and elaborate methods to realise this and put them into practice in the form of workshops. From the perspective of the field of art education, Munari clarified his awareness of the problems in traditional school education. Munari, who emphasizes creativity, sees in art education the potential for realizing an education that takes advantage of children's diversity and independence. According to him, artistic expression is not a reproduction, but always requires independence to create originality, and education for independent learning is, in essence, 'creating and supporting an environment in which children can try to do things on their own'. This philosophy is probably the same as that of Montessori, who said 'Let the children do for themselves'⁶ (Fujita, 2022).

As an artist and designer, Bruno Munari specialised in visual communication, but he also placed great emphasis on communication through the various senses and had a great capacity to put his thoughts into words, as evidenced by his many books. For Munari, creativity requires an elastic intelligence, a mind free from preconceptions of any kind, ready to change its opinions when a 'fairer' one presents itself, as creativity is formed and transformed continuously. In 1974 Munari's article *Proposal for a design school that begins in kindergarten*⁷, in which he emphasised how important it is for mankind to investigate from the earliest years of life what 'designing' means including methodology, creativity and self-criticism, which are indispensable for forming individuals with a particular design mentality, who are able to solve their own problems autonomously and without conditioning (Panizza, 2009). Creativity is also a purposeful use of fantasy, or rather imagination and invention, in a global manner. Creativity is used in the field of design, considering design as a way of designing, a way that, while being as free as fantasy and as exact as invention, encompasses all aspects of a problem, not only image like fantasy, function like not only invention, but also the psychological, social, economic, human aspect. One can speak of design as the design of an object, of a symbol, of an

⁶ Aiutiamoli a fare da soli

⁷ 'Proposta di una scuola di design che comincia dall'asilo'

environment, of a new didactic of a design method to try to solve collective needs, etc (Munari, 2017).

He strongly emphasised the problem of traditional school education's emphasis on verbal communication. For him, today's children are tomorrow's (future) adults. He advises to help them to live away from a stereotyped life, develop their senses and to be more sensitive. Because ‘creative children are happy children’ (Restelli, 2002). Ayşe E. Coşkun Orlandi (2010), in her article titled ‘Experimental experience in design education as a resource for innovative thinking: The case of Bruno Munari’, summarized the foundations of Bruno Munari's rich creative world as follows:

- i. His analytical approach of perceiving and interpreting the world,
- ii. His nature as a researcher to understand the relations between the natural and the artificial,
- iii. The continuous research focusing on the process not on the final solution,
- iv. Utilizing the curiosity of the nature of to play as a teaching method,
- v. Creative workshops based on the keywords: trial and error, improvisation and autonomy.

4.1. Bruno Munari: As a Designer

“When the objects we use every day and the surroundings we live in have become in themselves a work of art, then we shall be able to say that we have achieved a balanced life.”

Bruno Munari

Bruno Munari born in Milan in 1926, worked on different disciplines such as industrial design, sculpture, painting, literature, cinema and architecture, produced products and made innovative and modern contributions. The designer and design theorist Bruno Munari, who constantly expressed the hope that his art and designs would form the basis for a more democratic world, was popularly known for his work in the cultural field

(Caplan, 2017). Munari was the first artist in Italy to recognise the limits of traditional painting and sculpture and to try to open up artistic work to a wider range of techniques and materials such as plastic. With his 'useless machines' he was interested in exploring the time-space continuum and how to make a work of art that could interact with the environment and change accordingly. His aim was to make a truly and structurally dynamic work of art, surpassing even the Futurists in this respect. In a sense, Munari was the first Italian and one of the first European examples of kinetic art, which became a dominant movement worldwide in the 50s and 60s. Munari's machines are structuralist and geometrical in principle and are based on scrupulous planning of physical and mathematical nature (Figure 4.1., 4.2.) (Antonello, 2009). When Munari joined the Futurists, the Italian avant-garde art movement of the period, in Milan in 1926, he began his artistic work under the influence of Futurism (1909-1944). He exhibited his works in the collective exhibition "33 Futurist Painters" in Milan. He began to work as an art director, promoter and illustrator in some magazines. It is important to acknowledge the role that Futurism clearly played in the development of Munari's work. there can be no doubt that it had an influence on his œuvre, as it offered him many inspirational ideas and fostered a certain attitude towards artistic creation (Antonello, 2009). Then, he moved away from the influence of Futurism and discovered new areas by entering into a personal research in art, design and visual communication. He worked as a graphic designer at Mandalori and as an art director at Tempo and Grazia magazines. After World War II, he took part in the field of industrial products, layouts and prototypes for many important companies (Coşkun Orlandi, 2010).

Figure 4.1 shows one of Bruno Munari's *macchine inutili* (useless machines), designed using extremely lightweight materials such as paper, thin wooden sticks and silk threads. These structures are deliberately created to move freely with air currents, exemplifying Munari's dynamic approach to art and exploration of interacting with his environment. Munari's useless machines are not only challenged traditional art forms, but also pioneered kinetic art by emphasising the relationship between movement, space and the viewer's sensory experience.

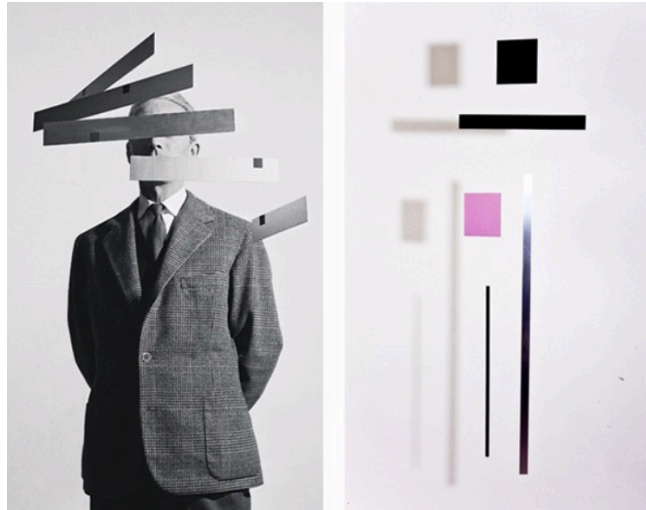


Figure 4.1 Munari's '*useless machine*'⁸ were built with very light materials like paper, thin wooden sticks and silk threads. The entire structure had to be "very light in order to be able to move in the air. (URL13)

After starting to research the field of education related to children, he applied his graphic genius to children's books and toys. In these works, he created works that taught movement and colors through kinesthetic, or sensory learning, using tactile surfaces and details (Munari, 2023). Munari's approach to design was didactic, influenced by his experiences in the Far East and Zen Buddhist philosophy, focusing on the process rather than the product (Altomonte, 2014; Coşkun Orlandi, 2010). Munari also established relationships between natural and designed forms. In this way, he paved the way for designs that developed with new techniques and materials that reflected the dynamic nature of the field (Munari, 2008). Bruno Munari (2008) advocated and supported that every artist should break away from romantic ideas and actively engage with contemporary techniques, materials and methods. Munari argued that designers, as modern artists, must maintain their modesty, possess technical knowledge, and address social demands. According to him, designers should reconnect art with the public by responding to the needs of users.

Bruno Munari aimed to encourage children's creativity through play by combining his work with artistic and industrial production with pedagogical approaches. He always emphasized the importance of providing education about art creation and suggested focusing on children (Fujita, 2022). Munari proposed workshops where children could

⁸ 'macchine inutili'

interact with visual art through play, using structured materials and techniques to encourage creativity. By learning through play, children would gain a deeper understanding of the constructive aspects of art, which he believed would cultivate a more discerning audience in the future. In fact, Munari was active in various fields throughout his life, such as art, design and writing, but his thoughts about human creativity led him to focus on art education for children in the second half of his life. He preferred to work in the field of education and produce in a didactic context. It was again the artist himself who defined himself using the term didactic and placed this term alongside many other terms.

His ability to combine a holistic understanding of artistic practice with a dose of irony and lightness earned him a reputation as ‘the Leonardo and Peter Pan of twentieth-century Italian art’. He was one of the pioneers of an artistic movement that helped revitalise the art scene in Italy, especially industrial design, and move towards a more comprehensive integration with the productive world of technology and industry (Antonello, 2009).

‘What is really important is the information that a work of art can convey, and to achieve this we must abandon all preconceived ideas and create a new object that will convey its message using the tools of our time,’ Munari stated in 1966 (Caplan, 2017). For Munari, technology was not an ideal or a myth but in the first instance an instrument. Also, he never tried to impose any abstract or ideas onto his technicians, but always sought their collaboration, by making any object, any work of art, “on the field”, working alongside with people who used these technologies in their everyday trade (Antonello, 2009).

4.2. Bruno Munari : As An Educator

Bruno Munari, known for his playful personality, did not claim to be a pedagogue as well as a designer. Munari's interest in didactics developed and matured fully from 1967, when the artist was invited by Harvard University to give a series of lectures on the subject of ‘visual communication’ at the Carpenter Center of Visual Art in Cambridge, Massachusetts (Altomonte, 2014). Munari, who has been involved in many disciplines and made important collaborations and brought innovations to each of them, is considered

a designer and experimenter. Although Munari does not claim to be a pedagogue, he emphasized the subjective characteristics of the student, their active role in the learning process and the figure of the educator who provides the experience of activities aimed at transferring knowledge as certain basic components of learning. Bruno Munari's approach to education, which includes a common aesthetic and cognitive sensibility in his work with children and adults, focuses on children's perceptual and creative capacities and is influenced by Piaget's theory that equates children's thinking processes with those of adults. Considering children as 'potential adults', Munari treats materials for them seriously. In his work for adults, he uses the same humorous and ironic language to address aesthetic and social issues. Munari intertwines the approaches he develops for children and adults and enriches his creative process in the field of visual communication by receiving feedback from the workshops he designs and makes for children (Altomonte, 2014).

In his article 'Proposal for a design school starting in kindergarten', written for Domus magazine in 1974, Munari addresses the subject of design in a decidedly utopian way, in the hope of a reality in which the figure of the professional designer will no longer be considered indispensable and the design of objects will be accessible to all who need it; he imagines that everyone will be able to grasp the tools and design methodology necessary for the elaboration of such objects. And so, he imagines a world in which everyone, from the youngest age, is adequately prepared for this purpose. In imagining and developing the teachability of his ideas, Munari always looks to developments in the pedagogical and didactic context of his own context (Altomonte, 2014). He used a pedagogical method that questioned the development of creative processes in children through learning, playing and having fun. Munari believed in the importance of play, discovery and multi-sensory experiences as basic elements in the creative process. (Coşkun Orlandi, 2010). Munari's work was diverse, including art, design and writing. However, in all these areas, he maintained a focus on play and experimentation with children from his youth to his later years. Munari's methodologies summarized in his book "Design as Art" (2008) emphasize the importance of creating environments that stimulate the five senses and encourage children to interact with materials in new and creative ways.

According to Bruno Munari, there are some important skills that children need to develop. First of all, students need to train their mental flexibility to think using their imagination and to develop a real project. In this way, they will have the ability to develop multi-sensory, more direct and intuitive projects with their senses. They should also be open to all kinds of problems and their possible solutions. It is important to develop skills such as avoiding dwelling on the first solution and training self-criticism. But above all, children need to learn to develop a project that can activate all these skills, that is, by experimenting (Figure 4.2).



Figure 4.2 Munari's workshop with children (URL14)

Munari not only designed and implemented games, but also investigated the formative education of children, considering what creativity means to people. Munari was sympathetic to children's curiosity, and the birth of his son Alberto was the catalyst for the creation of many illustrated children's books and educational playground equipment designs. In the following years, Munari organized workshops for children and continuously carried out educational workshops through the activities of his assistants. In addition, he developed the workshops with his successors so that they could keep up with the times and always be up to date. The educational methods that emerged in Munari's workshops are still applied by Munari's successors today.

In his book 'Design as Art' (2008), Bruno Munari touches upon the artistic ideas that are instilled in children during their education. These taught artistic ideas, which are often

difficult to change later in life, teach that art is limited to traditional forms such as painting, sculpture, poetry and architecture. He rejects the rigid definitions of painting that are done with oil on canvas, sculpture is three-dimensional and made of materials such as bronze or marble, poetry must rhyme and architecture is a specific art form. He criticizes the idea that the best art comes from the distant past and believes that modern art has lost its value after the Impressionists. Furthermore, he challenges the idea that visual art must imitate nature and contain a clear literary meaning in order to be considered true art. Munari's observations highlight the limitations of traditional art education and the impact of these teachings in shaping perceptions of art.

Munari has designed approximately forty picture books that are still in print and have been translated into many languages. One of these is Munari's experimental, interactive books called The Prebooks⁹, which were pre-reading experiences for children who had not yet learned to read (Figure 4.3). They were given the opportunity to explore a book through their senses, with colored or blank pages, different materials and different shapes. By exploring these special books page by page, the child can enjoy a book by interacting with their five senses (Munari, 2022).



Figure 4.3 Bruno Munari's Prelibri (URL15)

⁹ I Prelibri

He collaborated with schools, institutions and museums all over the world, such as Venezuela, Israel, Spain, US, France, and especially Japan. Starting from the 1980's, numerous exhibitions have been dedicated to his work in galleries, principal museums of contemporary art and in design centers worldwide. Throughout his career, he received many international awards. Some of the most important can be listed as: Compasso d'Oro, an important Italian design award which he received three times, the Honourable Mention from the New York Academy of Sciences, an award from the Japan Design Foundation for the intensely human value of his creations, and the Andersen Award for being the best author of children's books. Munari continued his works and research and he started also teaching a course in visual communication at Harvard University in 1967. From then on, Munari gave workshops not only in Italy but also abroad for nearly 20 years until his death in 1998 at the age of 91.

4.3. The Methodology of Bruno Munari

*If I listen, I forget
I'll remember if I see it
I'll know it if I do.*
Old Chinese proverb

This study tries to see the characteristics and possibilities offered by the Bruno Munari approach. Munari stated that all his activities were always directed towards two channels, experimental and educational (Altomonte, 2014). Initially called '*Playing with Art*', the method has aroused enormous interest both in Italy and abroad. Alberto Munari, the son of Bruno Munari, who was a direct collaborator of Piaget, states in an article that Munari applied the basic principles of 'active pedagogy'. Here he describes the many common thoughts between his father and Piaget. Both are against imposition and propose to experiment, to investigate and to do things independently, autonomously, through discovery and experimentation (URL 4). According to Sperati (2010), talking about the Bruno Munari Method is as difficult as talking about Bruno Munari himself. This means that in order to think about the relationship between the artist and the method that now

bears his name, we must first decide in which direction we want to direct our attention. Silvana Sperati explains it this way:

"For example, when we talk to a group of designers, we have to resort to a very specific, already codified approach that concerns this sector of research and study. Instead, when we talk to graphic designers, we should consider using the Bruno Munari Method, which is completely compatible with their field of research. The same thing happens when we talk to writers, painters, even inventors. Maybe it is the same for pedagogues today."

Munari suggests teaching children how to look at a work rather than reading its content or message. According to Bruno Munari (Coşkun Orlandi, 2010), who was influenced by his experiences in the Far East and by Zen Buddhist philosophy, it is important to proceed step by step in the education of children. Munari states that, as in the East, we should start using origami, visual games that encourage creativity and observation, modulated structures that cover three-dimensional space accurately and simply, and toys that will be built with combinable modules (Domus, 1984). According to Munari, who emphasizes that visual art should not be described with words but experienced, he repeats the idea that words are forgotten but experience is not, by quoting an old Chinese proverb: 'If I listen, I forget, if I see, I remember, if I do, I understand' (Restelli, 2002).

One of the most significant works carried out by the Bruno Munari Association (ABM) consists of an in-depth work on the re-founding and systematisation of the didactic methodology devised by Bruno Munari in his first 'Giocare con l'Arte' workshops in the 1970s. The original method, taken up and continued for more than 30 years, in their respective workshops in Italy and abroad, by some of Bruno Munari's direct collaborators who then contributed to the constitution of the ABM, has been subjected to a careful critical analysis in order to consolidate its epistemological and pedagogical foundations. The fruit of this long work of re-founding is now protected by the legally registered appellation 'Metodo Bruno Munari®'. Following this important work of re-founding, ABM organises specialised training courses qualifying the use of the Bruno Munari® Method for art education and the development of creative design thinking. The first

edition of the 'Master in Bruno Munari® Methodology' ended in 2006, with the awarding of 15 Diplomas to as many operators in the field of artistic and cultural education. Systematising, monitoring, defending and perfecting the Bruno Munari® Method continues to be one of the main aims of the ABM (L'Associazione Bruno Munari). Formidable help in this effort will come from Donata Fabbri and Alberto Munari - psychologists and epistemologists, former students of Jean Piaget - who within the The Bruno Munari Association - an institution that has officially developed and disseminated the artist's work for more than a decade - have carried out an important work of rereading and reflection on the basic principles that supported and oriented Bruno's didactic approach in what we now define creative design thinking education workshops (Sperati, 2020). Constantly seeking conditions that support imagination and creativity, the artist explains that it is necessary to 'ensure that the child memorises as much data as possible': Imagination is actually born from the relationships that the thought establishes between what it knows. Therefore, since 'creativity develops on knowledge and the child draws what he knows and sees what he knows', it should be aimed to help children expand their multisensory knowledge, understand how things are made, eliminate stereotypes. As a reminder, according to Bruno Munari, the child is present with all his senses: not only with hearing, sight, smell, taste and touch, but also with the sense of weight, the sense of temperature, the sense of balance. Therefore, he must be helped to expand his multisensory knowledge. In order to discover the properties of materials and to sharpen his observation skills, some didactic games can be proposed to children to learn through play (Restelli, 2002)

4.4. Phenomenology of the Munari Workshops

A Bruno Munari Laboratory is a place of creativity and knowledge, of experimentation, discovery and self-learning through play: it is the privileged place of doing in order to understand, where 'mental gymnastics' are performed and knowledge is built. It is also a place for educational encounters, training and collaboration. A space where one can develop the ability to observe with one's eyes and hands to learn to look at reality with all the senses. As we have already seen, the main objective is the stimulation of creativity and 'creative design thinking' from an early age: so, promoting creativity in children

means helping them to acquire an elastic and non-repetitive mind (Restelli, 2023). According to Bruno Munari's methodology, the workshop is a place of creativity and knowledge, of experimentation, discovery and self-learning through play: it is the privileged place of doing in order to understand, where one does 'mental gymnastics' and builds knowledge. It is also a place for educational encounters, training and collaboration. A space where one can develop the ability to observe with one's eyes and hands to learn to look at reality with all the senses and learn more, where one can stimulate creativity and 'creative design thinking' from childhood onwards (URL 4). Munari stresses the importance of engaging all five senses in learning. His workshops, which emphasize the use of various materials and multisensory experiences, allow children to experiment freely and express themselves without predefined outcomes, thereby fostering creativity, critical thinking, and problem-solving skills (Munari, 2017).

Above all, he wanted to underline, particularly in the last periods of his life, the value of the laboratories. He often reminded that children were the future. Proof of this is the response he offered to his son Alberto who interviewed him:

"The work that I consider, for now, the most important as a design project is that of the continuous development of a teaching method for the stimulation of children's creativity. For the creation of ever new workshops for children in various parts of the world, in museums and major exhibitions. Now I am developing a workshop for children on design, on how to design, starting from nursery school with the knowledge of materials and their possibilities. These workshops for children have in certain cases become a social service for schools and also for the elderly as well as children" (Munari, 1986).

In his workshops, the criteria guiding the creation is be discussed. In addition, the possibilities of creating new ones based on a wide range of educational, didactic and artistic expression needs are be emphasized (Munari 1981). The purpose of the 'Didattica sensoriale' (Sensory education) laboratories, in fact, is to invent actual prototypes of educational games that support open and diversified learning and stimulate exploration and creativity (Munari 2017).

Bruno Munari, together with Giovanni Belgrano and his son Alberto, a psychologist and collaborator of the Jean Piaget Centre for Epistemology in Geneva, designed the first workshop "*Giocare con l'arte*" ¹⁰ at the Brera Art Gallery (Panizza, 2009). *Giocare con l'arte* represents a different and still highly relevant approach to art in the museum, based on "doing in order to understand" and "doing in order to know" through direct experimentation with the techniques and rules of the visual arts. For his first workshop *Playing with Art*, Bruno Munari was commissioned to design a space for children. This was a concrete response to the provocative request of Franco Russoli, then Superintendent of Brera, who wanted actions capable of transforming the museum from an erroneous tower and sacred place of a select few into a living organism capable of being a tool of mass communication and a social service. The workshop was set up within an exhibition entitled *Process for the Museum* and became an event that spread over the next twenty years to various contexts such as private workshops, museum workshops, and refresher courses, both in Italy and abroad (Sperati, 2020). This innovative approach to art education was an immediate global success. For instance, the permanent workshop inside the ceramic museum in Faenza, the one at the Pecci Museum of Contemporary Art in Prato, and the experiences in Jerusalem, Venezuela, Paris, San Sebastian in Spain, Rio de Janeiro, and Tokyo, where a workshop still operates inside the National Children's Castle¹¹. In addition to these workshops, Munari and his assistants conducted countless others for municipalities, museums, schools, and associations, in a continuous work of experimentation and dissemination (Sperati, 2020). Munari's mind before the workshops at the Brera Museum. If I mention only those workshops held in museums and designed by Munari himself with his collaborators, to list them all would be long. Over the years, various themes have been developed and deepened in accordance with the artist's methodological indications, up to the recent special projects (URL 4). The techniques and rules experimented in the Brera workshop were: Divisionism, Signs, Textures, Far and Near, the Chromatic Perspective, Different Formats, Collage, Composable Forms, Colour, Cages and Direct Projections with descriptions below. This was followed by the *Tactile Workshops*, held on the occasion of the exhibition *Hands Watch*¹² in Milan at

¹⁰ *Playing with Art*

¹¹ *Kodomo no Shiro*

¹² *Le Mani Guardano*

Palazzo Reale (1979). Later workshops included *Playing with Art*, part of the artist's anthological exhibition at Palazzo Reale in Milan (1986–87); *Playing with Nature*¹³ at the Natural History Museum in Milan (1988) and at the Pecci Museum in Prato (1992); and the *Lab-Lib*, a liberating workshop focused on combinations of materials (URL 4). In his book *Fantasia* (Munari, 2017), the same year as the workshops at the Brera Museum, Munari describes the aims and methods of various workshops for children, and the examples overlap with the content of the workshops at the Brera Museum. Considering the timing of the publication, it can be assumed that the methodology of the workshops took concrete shape in Munari's mind before the workshops at the Brera Museum.

Having received a literacy-centred education, we adults and teachers in various schools tend to teach using words and ready-made models, instead of the way children learn, which they discover through direct touch and experimentation. Visual and communicative pedagogies have already started in schools. According to him (Munari, 2004) those years teaching through the sense of touch has not yet seriously addressed.' In fact, the aim of the "Sensory Teaching" laboratories was to invent real prototypes of educational games that support open and diversified learning and encourage discovery and creativity (Munari 2017). An example of this is the Pecci Museum Lab-Lib in Prato in 1992 (Figure 4.4), or the liberating workshop for material combinations. Lib-Lab is the Liberating laboratory, where adults and children are invited into unexplored areas to do without thinking to create new assemblages of materials that communicate through the senses. In Bruno Munari's workshop the tables are set up as if they were market stalls. Children can touch everything, discovering the qualities of the materials so as to choose their favorite ones to create compositions to "read" with their fingers. Experiments can be made with "sensory objects", this can be played with them.

¹³ *Giocare con la Natura*



Figure 4.4 Bruno Munari while playing with children in the Lab-Lib in Milan 1992 (Restelli, 2002)

In his workshops, the criteria guiding the creation is be discussed. In addition, the possibilities of creating new ones based on a wide range of educational, didactic and artistic expression needs are be emphasized (Munari 1981). In Bruno Munari's workshops, students engage their imagination to conceive and develop real projects, training their senses to create multi-sensory, direct, and intuitive projects. They develop mental flexibility, remain open to various problems and their solutions, and practice self-criticism, ultimately learning to craft projects that can foster these skills in children. The workshops provide a wide range of tactile experiences: soft like a cat, hard like a wall, cold like marble, soft like a sponge, hard like a brick, flexible like a bamboo stick, elastic like rubber, hot like polystyrene, heavy like a stone, light like a feather, and fragile like a soap bubble. Information is conveyed through compound senses (Fujita, 2022).

The methodology used in the Playing with Art workshops aims at understanding techniques and tools, manipulating materials through which the child becomes an active protagonist in discovering the rules, limits, and possibilities of the tools and the peculiar characteristics of the materials themselves (Panizza, 2009). The didactic principle of the Playing with Art workshops is: "not to say what to do, but how to do it" (Restelli, 2002). 'Understanding what art is is a (futile) concern of the adult. Understanding how to make it is instead a genuine interest of the child'. In this reflection, Alberto Munari, lecturer in educational psychology at the University of Geneva, indicates the essential principle of the method. Ideas are not proposed by adults, they come from experimentation, according

to the didactic principle: ‘Don't say what to do but how’. The method is based on doing so that children can express themselves freely without adult interference, becoming independent and learning to solve problems on their own (URL 4). The child is invited to explore and experiment with the components that lead to the creation of a work of art, understand its peculiarities, and re-elaborate the experience in the realization of a personal composition, observing the achievements of their companions and sharing discoveries with them, fostering a relationship of collaboration and research. For Munari, stimulating creativity means giving the child the freedom to express their subjectivity, i.e., adopting teaching strategies that do not coincide with simple letting-go but rather with the strengthening of a "doing" linked to the practical learning of specific tools and techniques. It is necessary to promote concrete activities in the form of play, in which the child's direct experience is fostered, because it is only through doing and acting in the first person that effective understanding can be achieved, involving the child in the cognitive and operational re-elaboration of the lived experience (Panizza, 2009).

4.4.1. First workshop: Playing with art¹⁴

These workshops are called *Giocare con l'arte* project took shape thanks to a conference entitled Museo Vivo organised by the Rizzoli Foundation in 1975/76, with the participation of scholars from various countries. The aim was to transform the museum from a simple place for the preservation of works of art into a mass communication tool that would place lifelong education as its fundamental perspective (URL 5). A museum, as Munari said, should be ‘an open window on the socio-cultural, political and economic panorama, of which the work of art is one of the most significant expressions’ (URL 5). A precise intention emerged to make the works of art housed in a museum comprehensible not only in their literary aspect but also in their technical substance, in a way that was easily accessible to all visitors and not only to specialists. Munari's personal contribution with his report resulted in the establishment of the first children's workshops in the Brera Art Gallery. The first workshop was set up at the request of the management of the Brera Art Gallery, with a pre-project group formed to focus on the age group of primary school pupils, so that the project could easily be adapted to the needs of both pre-

¹⁴ In Italian Language: *Giocare Con L'arte*

school and middle school (URL 5). Starting with an analysis of the techniques used in different eras to create works of art, those fundamental contents that could be translated into playful experience were chosen. Piero Polato was entrusted with setting up the space adapted as a workshop. The children were supervised by a group of Munari's collaborators, including Metta Gislon, Coca Frigerio, Marielle Muheim, and Tonino Milite. They were called 'visual operators' and were invited to feel free to make any changes to the project, according to the evolution of the experience gathered during the workshop's running time (URL 5). This approach prevented the fossilisation of the method, making it flexible and adaptable through continuous practice and updates.

Particular emphasis was placed on experimenting with painting and graphic techniques such as pointillism, signs, textures, chromatic perspective, collage, and colour; on the rules and methods of composition dealing with different formats, modular forms, cages, and direct projections. In the Brera workshop, children were free to choose the type of activity they wanted; to develop one or many experiences, to stay as long as they wished in one location or to change. This freedom of movement favoured continuous experimentation while respecting the personal rhythms of each child (URL 5). Munari's vision was that by integrating playful experience with art techniques, children would develop a deeper understanding and appreciation of art that extends beyond mere literary interpretation.

Munari's approach not only emphasized the technical aspects of art but also aimed to make art accessible and comprehensible to a broader audience, thereby fostering a lifelong engagement with art. These 10 activities implemented in his workshop are described below in Hisanobu Fujita's thesis (2021) about the knowledge and concept of the workshops:

- i. ***Divisionism***¹⁵ : The Pinacoteca di Brera includes works by Futurists Boccioni, Severini, Seurat and Signac, who used the Divisionist technique. Boccioni and others painted with pointillism, not with dots, but with strokes. The most obvious works that children can understand are Seurat's "Seated Model", Severini's "La

¹⁵ *Il Divisionismo*

danseuse obsédante", Signac's "Saint Tropez" and Segantini's "Dead Deer". What is important here is that the child understands the technique in the works. The answer to the question "What color do you see from a distance?" was sought among all the works. Colored pencils, sponges of various sizes, crayons, colored chalks, drawing papers of various sizes, easels or drawing boards and magnifying glasses are the materials used in this study. In this workshop, the child is asked to choose different types of paintings in different sizes by asking the question "What color does it look like from a distance?" They try them with a few children before making a choice. For this, they also use sponges of different sizes, crayons of different colors and colored chalks. In summary, this workshop aims to enable children to deeply explore color perception and artistic expression by experimenting with different artistic media and techniques. This workshop develops observation skills, creativity and collaborative decision-making.

ii. *Signs*¹⁶ : In this workshop, children explore the various signs used by artists from different periods and countries, observing how each artist chooses his or her own unique sign. The works of artists such as Klee, Hokusai, Ben Shahn, Hartung, Beardsley, Steinberg, Leger, Miró, Seurat and Boccioni are examined. The workshop highlights the variety of drawing techniques, such as Klee's calm pen and ink lines and Hokusai's fast, bold brushstrokes. Children are presented with long strips of paper showing different signs made with various materials. This helps children understand the connection between the sign and the medium. It develops an understanding of the wide range of possibilities in drawing. The workshop guides children to choose the sign that best suits their personality, using a single color (black) to avoid being distracted by multiple colors and to focus on the quality of the sign.

iii. *Texture*¹⁷ : This workshop introduces children to the concept of texture and/or the manipulation of colored surfaces through the works of artists such as Braque,

¹⁶ I Segni

¹⁷ Le Texture

Morandi, Dubuffet, Tobey, Klee, Lichtenstein, Wilding, Dorazio and Morellet. Children are provided with different tactile experiences with a variety of materials. In this way, children learn how to texture surfaces organically or geometrically. This activity involves placing paper on textured surfaces and using crayons or chalks to transfer the texture to the paper. This hands-on approach helps children understand how texture can add visual and tactile quality to artworks. They are encouraged to experiment with different textures and colors, developing their sensory perception and creativity.

iv. *Far And Near*¹⁸: This workshop explores perspective through the play of near and far. Using examples from landscape painters such as Turner, Friedrich, Corot, Constable, and traditional Chinese and Japanese paintings, children learn about the perception of distance and nearness that color intensity can create. Children are given a series of cards showing the same color in varying intensities, from dominant and near to faint and far. They experiment with crayons to replicate these effects and learn how to use color to convey depth in their drawings. This exercise helps children understand color perspective and its role in visual storytelling.

v. *Different Formats*¹⁹: In this workshop, children are introduced to different painting formats and concepts, inspired by examples such as Raphael's Madonna in the Chair (a disc), Braque's oval still life and Leonardo's lunulae. In the workshop, children are given papers of various shapes and sizes and are encouraged to think creatively about how the format affects the composition. Children are encouraged to work with unconventional formats and to come up with new ideas and compositions with standard-sized papers. This activity stimulates imagination and reduces competition, as the different capacities of each child make it difficult to copy from each other. Therefore, it encourages them to work freely.

¹⁸ Lontano a Vicino

¹⁹ Formati Diversi

vi. ***Collage*²⁰**: In this workshop, children go beyond sticking random materials and explore the artistic possibilities of collage. Inspired by Dadaist, Surrealist and Cubist artists, children learn to use different materials to present specific ideas. The activity involves working with different types of paper and cardboard, each with its own texture and tactile quality. Using these materials, children create collages, focusing on one material of their choice each time (for example, plain paper, printed paper, corrugated cardboard). This approach helps them understand the potential of each material in communication. It encourages experimentation and creativity.

vii. ***Modular Shapes*²¹**: In this workshop, children are introduced to the concept of playing with similarly modular shapes, such as Lego or Meccano. Inspired by artists working in concrete or constructivist art such as Balla, Mari, Bill, D'Adda, Boschini and Verstockt, they explore how geometric forms can be combined to create patterns and compositions. Children use pre-cut colored cardboard shapes to create two-dimensional compositions on neutral colored cardboard bases. This exercise helps them understand the principles of spatial modulation and geometric design, developing their rational thinking and creative expression.

viii. ***Color*²²**: Designed for younger children, this workshop focuses on exploring different shades of a single color. Each session is dedicated to a single color, offering a variety of shades for children to experiment with. Using their hands, children apply colors to white paper, encouraging sensory development and an understanding of color variation. This approach helps children explore the richness of a single color and allows them to express their individuality through their color choices.

ix. ***The Cages*²³**: This experimental workshop aimed to teach children about harmonic structures in art using grids pre-printed on rectangular sheets of paper of

²⁰ Il Collage

²¹ Forme Componibili

²² Il Colore

²³ Le Gabbie

various sizes. However, this workshop was too complicated for primary school children and was postponed until it was done for older students. The aim was to show that the figures in a picture are not always in the centre, but are arranged according to geometric and optical rules.

x. *Direct Projections*²⁴: This workshop involved creating visual compositions using transparent colored materials such as cellophane and small natural objects. By placing these compositions on a projector, the works both stimulated creativity and provided an interesting sensory experience. In this way, the aim was to create visually exciting displays.

In this way, each workshop emphasizes hands-on exploration. It encourages children to experiment by using different materials and techniques to enhance their sensory development and creative expression. Through these activities, children learn to recognize the various possibilities in art, developing a deeper understanding and love for creative play. All the senses of the child are not just hearing, seeing, smelling, tasting and touching. The sense of weight, the sense of temperature, the sense of balance should also be taken into account. Therefore, it is important to help children expand their multi-sensory knowledge. There are some didactic workshops suggested for children to explore the properties of materials, sharpen their observation skills and learn through play. In this context, a selection of five senses based interactive workshops taken from the works of Hisanobu Fujita (2022) and the book by Beba Restelli (2023), a collaborator and successor of Bruno Munari, to inspire the work is described below.

4.4.2. Five senses-based interactive workshops

There are many workshops in which Bruno Munari was active until the end of his life and made different collaborations. Below, different sensory workshops suitable for children between the ages of 3-6, which are also the focus of this thesis, have been selected. Below are the workshops that Munari conducted together with his successors and the workshops developed by them.

²⁴ Le Proiezione Dirette

1. Playing with the photocopier²⁵

Munari uses the photocopier as a tool that characterises the play. But he does not use it to make photocopies, but to utilise its other potentialities. He creates a composition by combining materials such as pieces cut from magazines, waste, plant branches, etc. and organises it. The game is completed by asking the children 'what does this remind you of?

2. The discovery box: touching with the eyes and seeing with the hands²⁶

This workshop, which is made to understand what the world is made of, is a game that enables to develop knowledge of materials and to recognise materials. It encourages children to find new materials and helps them discover them. At the end, the connection with the material is strengthened when the children give a name to the new material they find. In this way, experimental thinking begins to develop.

3. The game of maximum contrasts²⁷

It is a sensory workshop based on defining opposites using materials with contrasting surfaces. It aims to develop tactile perceptions. For example, it does this by comparing a very smooth material (silk fabric, coated paper, etc.) with a material with a very hard surface (sandpaper, abrasive sponge, etc.). In the next process, this is strengthened by increasing the variety of materials.

4. The transparency and play of the transformable landscape²⁸

It is realised in order to define nature and permeability. Permeable and semi-permeable surfaces of different materials are positioned one after the other and different compositions of natural materials are placed between each of them. The surfaces placed layer by layer support the feeling of opacity and permeability. This work, which is achieved by superimposing semi-

²⁵ Giocare con la fotocopiatrice

²⁶ La scatola delle scoperte: toccare con gli occhi e vedere con le mani)

²⁷ 'Il gioco dei massimi contrasti'

²⁸ 'La trasparenza e il ioco del paesaggio trasformabile

permeable and permeable materials on top of each other, allows the creation of unlimited compositions that can be realised with unlimited options. The following image is an example of a play on transparencies. This example is part of a book entitled *Nella nebbia di lan* (In the Fog of Lan). In this book, the fog is presented on a group of tracing paper pages. Each page has an element of the landscape printed on it, it consists of ten pages, (Restelli, 2002)



Figure 4.5 Transparencies creating fog (Restelli, 2002)

5. A dip in the touch pool for children aged 2 to 4 years²⁹

It was created to concretise the entrance to the world of materials produced to be touched. It is aimed to feel the material with the whole body. It is constructed by turning 2 large areas into a corridor with 2 different materials. Thus, it is experienced not only by touching with the hand, but also with the body. The experience ends with the completion of the circulation by passing through it.

6. A tactile forest³⁰

A large number of different materials are aimed to give different tactile sensations and develop imagination. Children start the game with a blank wall and a table with all the materials. After all the materials are hung from the ceiling (wool yarns, feathers, balls, knotted ropes, plastic bottles, chains, etc.),

²⁹ 'Un tuffo nella vasca tattile per bambini da 2 a 4 anni

³⁰ Un Bosco Tattile

the process of observing them takes place. Then, in the room where the materials hang and cover the walls, exploration through touch begins. Through visual interaction with these materials, followed by tactile interaction (touching the feathers, untying the knot, moving their arms around the chains, etc.), creativity develops and they embark on a tactile journey through this material forest.



Figure 4.6 Bosco tattile (Restelli, 2002)

7. Colorful trips given 'naturally'³¹

It is a game to be able to identify the colour green, which Munari defines as 'the colour of nature'. It defines the symbols and meanings in nature with the colour green and enables children to recognise and define different greens. Children go on a discovery in nature and follow the traces of green. Thanks to the leaves, branches and their textures and odours they find in nature, their creativity develops and they get to know nature. It starts by watching the leaves, then touching the edges and surface of the leaves found and then smelling them. Sometimes the leaves are crushed and the sounds they make are listened to. In this way, children integrate with nature and use different senses together.

³¹ 'Viaggi colourati dati 'naturalmente''

8. The taste of green ³²

It is a game based on activating the senses of children between the ages of 3-8. It starts with the desire to discover green foods. It provides the gathering of green-coloured foods (such as celery stalks, lettuce, crumpled spinach) collected from the environment and the feeling of the materials by observing and touching them. It also offers the experience that the flavours of foods can be better perceived by touch.



Figure 4.7 Discovering green foods (Restelli, 2002)

9. Smells, memories, sensations ³³

It is designed to develop the sense of smell of children aged 4-6 years. It focuses on the human brain, creativity, integration with memories and strengthening emotions. It focuses on the emotions and memories created by the smell, such as the smell of maki reminds us of a holiday, the smell of wood takes us to a memory of childhood on the farm.

10. The mood agenda. What color are you today? ³⁴

Designed for 3-5 year olds to describe the power of colour to evoke senses, memories and emotions. Describes the mood with colours. Allows children to describe their feelings with colours. For children aged 6-8 years, it is carried out by making a combination of the feelings created by colours. It is

³² Il gusto del verde

³³ 'Odori, ricordi, sensazioni'

³⁴ 'L'agenda dell'umore. Di che colore sei oggi?'

realised with the idea that exploring and expressing emotions creatively starts from childhood.

11. Mom, I'm afraid of the dark... ³⁵

Created with the identification of darkness in mind for children. It makes children experience light and darkness together and supports the definition of opposites in children's minds. Through activities such as playing games in the dark and playing with shadows, it enables children to face their fears of darkness and define them through play.

12. But is the sky always and only blue? ³⁶

It was carried out to identify the sky and its colours. The aim is to help children remember many colours after observing different colours of the sky. An example of these reminders is reflecting the sunset colour on the wall by shining light on semi-permeable red materials. It is ensured that they paint many different colours of the sky, which is usually depicted in blue, using many different materials and interact with the material in this way.

13. How do clouds speak? ³⁷

It was carried out in order to discover, recognise and define nature. It aims to explore the flow of nature such as clouds, sun, snow, rain. It is done by observing the movements and changes in the sky at the current moment. Munari's approach often bridges art and the natural world, using simple elements to evoke complex emotions and sensations. As he poetically describes, 'The red sun, white clouds, rain, snow, a white moon on transparent blue, a lost little dog. Just enough to make good and bad weather. Looking at it this way, the rain mixes with the wind' (Munari, 2022)

³⁵ 'Mamma, ho paura del buio...'

³⁶ 'Ma il cielo è sempre e solo azzurro?'

³⁷ 'Come parlano le nuvole?'

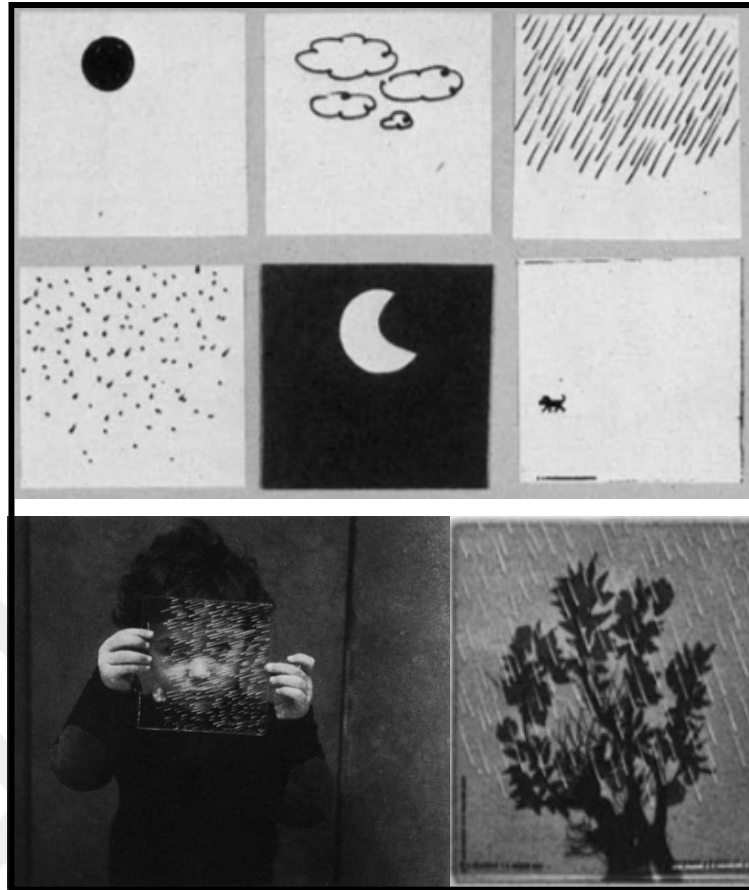


Figure 4.8 Munari's workshop with weather elements through simplicity and emotion (Munari, 2022)

14. The cloud game³⁸ This game is suitable for adults and children of all ages and supports creativity in understanding the shapes of clouds. It is also carried out as a question-and-answer game by observing the shapes of the clouds. Thus, it is aimed to contribute to the development of creativity and communication



Figure 4.9 Shapes of the clouds (Munari, 2022)

³⁸ 'Il gioco delle nuvole'

15. First signs: the game of footprints and traces ³⁹

It is carried out by removing the traces of our hands and feet on different materials. It is aimed to strengthen children's creativity while feeling different materials such as sand, clay, paint, mud with hands and feet, while defining their traces on the surface.

16. Playing with Sounds ⁴⁰

The workshop "Playing with Sounds" was initiated by the Department of Education and Vocational Training of the Lombardy Region to celebrate the International Year of the Child. Presented at the Milan Triennial, this game aimed to integrate the acoustic experiment into preschool education programs. It was later created in February 1988 at the 'Sauro' primary school in Lecco, with the contributions of Giovanni Belgrano, Davide Mosconi and Bruno Munari. A video entitled "Giocare con i suoni" ("Playing with Sounds"), produced by the IBM Audiovisual Center, presents the development of the project and provides an overview of the object-instrument relationship created and their functionality. The aim of the experiment was to understand the origin and nature of sounds using these instruments, to recognize different timbres and tones, and to relate and combine them. The workshop featured instrument-objects that evoked futuristic devices. These included chordophones, idiophones, aerophones, membranophones, mechanical wheels, electronic rhythm instruments, and synthesizers. Chordophones and idiophones were designed as percussion, percussion, and friction devices, while aerophones taught children about sound production through different mouthpieces. Although the musical instruments designed for the workshop remained prototypes due to lack of follow-up, the experiment allowed participants to explore acoustic principles such as pitch, intensity, and duration. The workshop also allowed for the exploration of everyday objects as instruments and the listening of natural sounds such as rain or wind in leaves.

³⁹ Primi segni: il gioco delle impronte e delle tracce

⁴⁰ Giocare con i suoni

In Munari's workshops, children experiment with techniques and rules derived from works of art from various periods and regions, and transform them into fun activities. Through hands-on experiences, children discover the different qualities and properties of materials. The aim of these workshops is to encourage knowledge and understanding of artistic techniques and communication, allowing children to look at art with greater awareness and criticality (URL 4).



5. RESEARCH FINDINGS

The characteristics of the environment created in educational institutions have a significant impact on children's cognitive development and the concept of learning is changing rapidly in the 21st century. Given the fact that we live in an interconnected world, advances in technology and science make it necessary to seek new methods for teaching and learning. The possibility of permanent connection with the rest of the world through worldwide communication, technological tools that give students the opportunity to learn in more effective and direct ways, and new studies in psychology and pedagogy that put students at the centre of the learning process rather than leaving them in a passive state, require an alternative and holistic view of the concept of 'learning environment'. Positive findings show that creativity can be developed with similar appropriate and correct educational environments, materials and methods worldwide. If there is a curiosity in the child that enables him/her to acquire different knowledge and relate them to each other, if this curiosity is dynamically combined with a child who knows how to imagine, who knows how to diversify his/her experience through continuous reflective play based on objective elements, who does not get bored, who knows how to be constantly amazed by what he/she discovers, that child may even see a 'world' of sensations, possibilities and qualities based on simple elements. The concept of space is a multidimensional formation beyond its physical existence. The human being, who is the reason for the existence of space, enters into a mental, perceptual and physical dialogue with space. The act of sensing and the five senses related to it are of great importance in the interaction process of the child who perceives and experiences the space.

There are some educational approaches such as Dewey, Waldorf, Fröbel, Montessori and Reggio Emilia that emphasise creativity and multisensory learning to different degrees. Two of these, the Italian Montessori and Reggio Emilia approaches, place a more central and fundamental role for sensory experience in education and have a philosophical relationship with Munari. Especially in urban areas where space is often limited, especially in metropolitan environments, the implementation of the basic principles of

these approaches requires innovative and thoughtful design solutions. Bruno Munari, an artist and designer, but also an intuitive pedagogue adopting the didactic principle, has many similar approaches to thinking with Piaget and Maria Montessori. All three are opposed to imposition and propose doing: experiment, investigate and explore on their own, autonomously. Experimentation and learning through the senses is common. One of the most important components of education, which is a multifaceted and complex process, is the physical environment of educational buildings. Besides educational resources, teacher quality and curriculum, the physical conditions and design of educational buildings significantly affect students' learning performance. In this context, Bruno Munari's pedagogical approaches that encourage design, art and creativity can be associated with certain educational philosophies and methods. However, some approaches may be more directly linked to Munari's philosophy. It can be argued that Munari's work is closely related to the Reggio Emilia and Montessori approaches. Munari's art education, which continued until the end of his life, began with a workshop at the Brera Museum in Milan in 1977. Munari approaches the 'Montessori Method' (Panizza, 2009) by stating that in these workshops there should be an adult companion as the facilitator of the activity, whose sole task is to help the child by showing him/her how to use the techniques. Furthermore, the influence of Munari's workshops can be seen in early childhood education in Reggio Emilia in Italy (Fujita, 2022).

The similarities between Bruno Munari and the Montessori and Reggio Emilia educational methods are evident in their emphasis on the use of different sensory and natural materials to stimulate creativity, exploration and learning. The importance and method of Munari's visual communication and art-orientated sensory experiments shape the spatial designs of these educational methods. Like Montessori, Munari encourages environments where children can freely use, experiment and explore materials with their senses. Both emphasise the importance of touch and interaction with materials in child development. Munari's focus on free exploration is in line with the Reggio Emilia philosophy where children engage in expressive activities through art and play. In this context, Munari's ideas can be adapted by creating interactive walls and spaces where children can manipulate materials, draw freely or participate in hands-on art projects.

Munari emphasises sensory exploration and the importance of involving all five senses in learning. Kindergarten designs should provide experiences that stimulate all of a child's senses (Munari, 1971). It emphasises the importance of using a variety of sensory experiences to engage children in learning. In kindergarten design, incorporating different textures, colours, sounds and smells can enrich children's sensory experiences (Munari, 1997). By integrating these principles into preschool design, educators and designers can create environments that support and enhance children's creative development in line with Munari's educational philosophy. Sensory games contribute to both cognitive and physical development of children. It also enhances children's creativity and problem-solving skills by increasing their interaction with their environment. Bruno Munari also emphasised that these sensory experiences play a critical role in children's learning about the world, often through play and art.

In a world where we all use visual communication more than verbal and written communication, it has become crucial to know how to use the basic elements consciously and appropriately. In this context, the art-based experimental education system should be recognised as a unique method of creative education. The most distinctive feature of Bruno Munari's laboratories and methodology is that they are based on sensory exploration and experiential learning. In his workshops, Munari designed environments that encourage children to learn by exploring different materials, textures, colours and shapes. Munari's methodology emphasises that children should be active participants in the learning process, teachers should only act as guides, and education should be based on individual discovery and real experiences. Believing that the creative process should be supported by sensory exploration and experimentation, Munari based art and design on individual experience. He emphasises the participation of children and adults in original creative processes. Munari's work offers a fun learning process through exploration and experience. By determining the methods of the workshops (Table 5.1), it was concluded that methods such as Learning from the Five Senses / Sensory Exploration, Connection with Nature, Exploration of Opposites, Artistic Expression are at the centre of Munari's pedagogical work. In this context, a preliminary study of which of the mentioned methods are prominent in the 16 workshops developed by Bruno Munari and his successors for children between 2-6 years of age in the focus of his methodology

mentioned in the thesis (Table 5.1). In this way, what these workshops say about Physical Design Principles and Child Interaction Dynamics was inferred (Table 5.2).

Table 5.1: Inferences of the general characteristics of the workshops between the ages of 2-6 years carried out in the Bruno Munari Methodology Focus

Workshops on Bruno Munari Methodology		Workshops' Methods			
		Sensory Exploration	Connection with Nature	Exploration of Opposites	Artistic Expression
1	Playing with The Photocopier				
2	The Discovery Box: Touching with The Eyes and Seeing with The Hands				
3	The Game of Maximum Contrasts				
4	The Transparency and Play of the Transformable Landscape				
5	A Dip in The Touch Pool				
6	A Tactile Forest				
7	Colorful Trips Given 'naturally'				
8	The Taste of Green				
9	Smells, Memories, Sensations				
10	The Mood Agenda: What color are you today?				
11	Mom, I'm Afraid of The Dark...				
12	But is the sky always and only blue?				
13	How Do Clouds Speak?				
14	The Cloud Game				
15	First Signs: The game of footprints and traces				
16	Playing with Sounds				

Munari can be described as experimental and multidisciplinary, having worked in various fields such as art, graphic design, painting, photography, sculpture and book design. Elements such as movement, light, colour, texture and sound are frequently used in Munari's designs, indicating that he has a perspective focused on creativity and exploration. In this context, it has been concluded that all of Bruno Munari's workshops, the contents and implementation of which are detailed in the table above (Table 5.1), have Sensory Exploration characteristics. In addition to this, it was concluded that each of them also had the features of Connection with Nature, Exploration of opposites and artistic expression.

By integrating Bruno Munari's innovative methods with contemporary design principles, we can create spaces that not only support but also actively encourage the creative development of young children. In this context, it is essential to establish a framework for designing educational spaces that foster creative development. The following recommendations focussing on spatial designs for early childhood education can be applied to achieve this goal. To help children develop a more comprehensive and detailed understanding of their environment and to help them express their creativity by considering a design that focuses on stimulating all the senses in the learning process, spaces should be designed to stimulate their senses, primarily sight, touch, hearing, taste and smell. This is focussed taking into account the rules of Bruno Munari's methodology, learning through the five senses, experimentation, connection with nature, learning differences and contrasts, learning by doing and integrating art and play. In this context, what the relevant workshops say in terms of physical design and what they emphasise in terms of interaction in the children's world is analysed in Table 5.2 For this analysis, all the information obtained within the thesis was filtered beforehand and appropriate keywords were listed. For each workshop, the keywords under the headings of physical design principles and child interaction dynamics enabled the identification of design principles that encourage creativity. The relevant physical design principles and child interaction dynamics table is as follows:

Table 5.2 Physical Design Principles and Child Interaction Dynamics in the Focus of Workshops with Bruno Munari Methodology

Workshops	Physical Design Principles	Child Interaction Dynamics
1	• Use of Technological Tools • Reflection-Space Communication • Prepared Environment • Using Different Materials • Creating Suitable Presentation Environments	• Sense of Sight • Imaginative Play • Imagination Visualisation of Emotions and Memories • Space-Colour-Shape Communication
2	• Tactile Architecture • Natural Light Requirement • Integration of Natural Elements Flexible Space Fiction • Space-User Communication • Common Space Fiction, • Prepared Environment • Dynamic Environment • Using Different Materials • Creating Accessible and Safe Circulation Areas	• Sense of sight • Sense of smell • Sense of touch • Sense of weight, • Imaginative Play • Learning by Doing • New Material Discovery • Naming New Materials, Establishing a Connection • Space-Colour-Shape Communication
3	• Tactile Architecture • Prepared Environment • Use of Contrasting Materials with Different Textures on Horizontal and Vertical Surfaces	• Sense of touch • Sense of sight • Imaginative play • Learning About Opposites • Space-Colour-Shape Communication

4	• Natural Light Requirement • Integration of Natural Elements • Reflection-Space Communication • Integration of Natural Elements • Different Visual Experiences Created by the Placement of Different Materials and Natural Elements between Permeable Semi-permeable Surfaces	• Sense of sight • Sense of space • Learning by doing • Space-Colour-Shape Communication
5	• Tactile Architecture • Flexible Space Fiction • Space-User Communication • Prepared Environment • Dynamic Environment • Common Space Fiction • Use of Different Materials • Sensory and Bodily Experience with the Use of Different Textures, Open and Closed Space Creation	• Sense of touch • Sense of thermal • Sense of smell • Sense of sight • Sense of space • Space-Colour-Shape Communication
6	• Tactile Architecture • Flexible Space Fiction • Space-User Communication • Prepared Environment	• Sense of sight • Sense of touch • Sense of space • Thermal sensation • Imagination

	• Dynamic Environment • Creating Circulation • Sensory Experience with the Use of Materials with Different Textures and Properties on Horizontal and Vertical Surfaces	
7	• Tactile Architecture • Natural Light Requirement • Integration of Natural Elements • Dynamic Environment • Indoor Outdoor Accessibility • Experiencing the Textures of Materials in Nature and Different Shades of Green Colour • Integration of Natural Elements	• Sense of touch • Sense of hearing • Sense of sight • Sense of weight • Exploration • Interaction with nature • Space-Colour-Shape Communication
8	• Natural Light Requirement • Integration of Natural Elements • Outdoor Accessibility • Dynamic Environment	• Sense of touch • Sense of taste • Sense of sight • Observation • Interaction with nature • Learning by doing
9	• Tactile Architecture • Integration of Natural Elements • Space-User Communication	• Sense of sight • Sense of smell • thermal sensation • Interaction with nature • creativity

	• Dynamic Environment • Outdoor Accessibility • Use of Different Natural Odours in Space • Integration of Natural Elements	
10	• Use Different Colors	• Sense of sight • Creativity • Experience of Different Emotions • Space-Colour-Shape Communication • Describing Memories, Emotions and Senses with Colours
11	• Tactile Architecture • Natural Light Requirement • Flexible Space Fiction • Space-User Communication • Reflection-Space Communication • Prepared Environment • Simple, Calm, And Peaceful Spaces • Use of Light and Darkness Together • Use of Different Light Levels • Use of Natural Light • Use of Artificial Light	• Sense of balance • Sense of sight • Sense of space • Overcoming fears of darkness • To get acquainted with the phenomena of darkness and light • Creativity

	• Shadow Experience • Creating Safe Areas	
12	• Natural Light Requirement • Space-User Communication • Outdoor Accessibility • Integration of Natural Elements • Simple, Calm, And Peaceful Spaces	• Interaction with materials • Nature observation (Interaction with nature) • Sense of sight • Space-colour-shape Communication • Creativity
13	• Natural Light Requirement • Space-User Communication • Space-Colour-Shape Communication • Simple, Calm, And Peaceful Spaces • Outdoor Accessibility • Strong Indoor-Outdoor Relationship	• Sense of sight • Nature observation • Creativity
14	• Observation Areas for Nature • Space-User Communication • Simple, Calm, And Peaceful Spaces • Outdoor Accessibility • Strong Indoor-Outdoor Relationship	• Sense of sight • Sense of time • Sense of movement • Communication development • Visual creativity • Observation • Creativity
15	• Sensory Enrichment Elements and Materials	• Sense of sight

	• Integration of Natural Elements • Space-Colour-Shape Communication	• Tactile and Visual Development and Interaction • Learning by doing • Creativity
16	• Tactile Architecture • Prepared Environment • Dynamic Environment • Sensory Enrichment Elements and Materials • Integration of Natural Elements • Observation Areas for Nature • Use of Different Surfaces • Environments Enabling the Use of Everyday Objects as Instruments • Interaction with Nature • Outdoor Accessibility • Openings (Glass Ceilings, Wide Windows, Atriums, Inner Gardens) and Acoustic Environments that Facilitate Experiencing the Sounds of Nature	• Sense of hearing • Sense of touch • Learning by doing • Creativity

In this context, the analysis of the related table shows that the design principles that encourage creativity are most prominent under the titles of Sensory Design and Flexibility.

It is concluded that spaces that support sensory exploration in children's learning processes should be designed in accordance with Bruno Munari's methodology. In addition, it has been observed that flexible and dynamic spaces allow children to interact with their environment in a more meaningful way and create a foundation that supports creativity and imagination. The findings of the study are an important guide for spatial design principles that support children's sensory and cognitive development. In this direction, it can be said that Sensory Design and Flexibility approaches offer a framework to support creative learning processes in the design of early childhood education spaces.

5.1. Design Principles That Encourage Creativity and Suggestions

The first step in designing a space is to determine which activities and events the space will be used for. These are functional requirements. From the child's point of view, the activities of a group room are many and varied. It also creates a complex pattern of behaviour that occurs within the four walls of the room. Therefore, the designer should start the design by identifying and listing all the developmental, educational and care activities that he/she wants to take place in the room. Functional requirements include activities (eating, sleeping, crawling, crawling, cuddling, reading, painting) and equipment (refrigerator, chairs, cribs, cabinets) and the lighting and acoustic requirements needed to support these functions. The functional requirements and their number are related to the needs of the children. They should also reflect what each caregiver wants to offer according to their interests and abilities (Olds, 2001). The formation of indoor qualities in pre-school education areas involves quite comprehensive and complex components. The child's physical needs, psycho-social and imaginative development, biological and cultural needs such as responsibility, belonging, sleep, food and friendship, and the variety, group and layout of activity areas are taken into consideration. In addition, the more stimuli the child is exposed to, the more the child's development in various fields is supported. For this reason, the development and education of children in preschool environments can be facilitated indoors and opportunities for play, experimentation, research, creativity and discovery can be offered.

This research also aims to propose a set of design principles that encourage creativity by acting as a guide. In this context, the focus is on the 3-6 age group, which is considered to be an important age range in which learning and development take place intensively, basic habits of the child are formed and the foundations of creativity are laid. Inferences were made from the workshops based on Bruno Munari's educational philosophy and methodology, which supports children's creative thinking and problem-solving skills, emphasising learning through the five senses and experiencing by doing. In this direction, it aims to provide analytical tools and practical guidance for the design of interior and exterior spaces of pre-school education institutions based on the principles of sensory design and flexibility.

In educational environments, designing spaces that facilitate both art and play can significantly enhance the learning experience and creativity by providing flexible spaces, a variety of materials and opportunities for open-ended activities. Some factors that stimulate the senses and exploration of opposites to support child development are the concept of scale in the physical space, floor height, ceiling height, height of boundary elements. Sensory diversity is increased when special and separate spaces are created to integrate different activities. The diversity created within the space will contribute more to children's development as it will increase opportunities for learning and play. Thus, warm and cosy, dark and light, big and small, noisy and quiet spaces, richness of light, colour and texture can be created (Dudek, 2007). Insights into these highlight key aspects of spatial distribution and the 'soft qualities' of environments such as light, colour, materials, sound, smell and microclimate. The combination of contrasting concepts (Table 5.3) in a single space enriches children's tactile and visual perception, as for example in the workshops 'The Game of Opposites' (Il gioco dei massimi contrasti) and 'The Tactile Forest' (Un Bosco Tattile). Furthermore, a different spatial experience can be offered through the use of overlapping permeable panels, as in the workshop 'Transparency of the Transformable Landscape' (La trasparenza e il gioco del paesaggio trasformabile) (Figure 5.3). In this context, the spatial sensory contrasts that can be utilised when

designing a space in order to apply the principle of the discernment of contrasts can be examined in the table below (Table 5.3).

Table 5.3 ‘‘What are the maximum contrasts’’(Restelli, 2002)

Spatial Sensory Contrasts		
Soft	X	Hard
Smooth		Rough
Hot		Cold
Thin		Often
Porous		Compact
Light		Heavy
Clear		Dark
Rigid		Elastic
Yielding		Resistant
Rigid		Folding
Rigid		Flexible
Curved		Edgy
Wet		Dry
Liquid		Solid
Matt		Glossy
Transparent		Covering
Noise		Silence
Odourless		Smell
Concave		Convex

In the design of tactile and sensory areas, it is important to use surfaces and materials that will stimulate children's five senses. These materials should be organised in such a way as to increase children's desire to explore. The quality, design, aesthetic appeal and softness of the finishing materials profoundly affect the spatial spirit of a building and how people feel inside. In particular, ‘softness’ is a determinant of the quality of a childcare centre. Surfaces with different textures (rough, soft, rough, hard, etc.) and coloured elements can be integrated into the interior to enhance children's sensory awareness. Finishing materials with different textural qualities should be used in one area

to provide variety of tactile experiences and difference within sameness. Accessing information about the materials and their qualities in the list (Table 5.2.) below will help in the material selection process while designing. The list, taken from Beba Restelli's work and prepared by a group of teachers, is as follows:

Table 5.4 Materials and Textural Qualities

Materials	Textural Qualities
Sponge	Soft, Porous, Abrasive, Rough, Scratchy, Dry
Cotton Wool	Warm, Hairy, Deformable
Garza	Transparent, Thin, Frayed, Loosely Woven
Paper	
Extra Strong	Smooth, Light, Thin, Opaque, Noisy, Bendable Fluttering
Tissue	Light, Semi Transparent
Absorbent	Absorbent
Silver	Mirroring
Velvety	Smooth, Soft
Recycled	Grainy, Irregular
Stainless Glass Window	Rough
Patinated	Shiny, Smooth
From Shiny	Semi Transparent
Seeds	Granular, Round
Fabrics	
Wool	Shaved, Deformable, Foldable, Soft, Warm, Smooth
Jeans	Resistant
Velvet	Soft, Smooth, Striped, Ribbed

Silk	Smooth, Slippery
Cloth	Hairy, Warm
Cotton	Smooth, Compact
Jute	Rough, Stiff, Thick, Heavy, Loosely Woven
Tulle	Light, Transparent, Perforated
Blades	Shiny, Bright, Elastic
Hemp	Filamentous
Plastic	
Sheet	Smooth, Stiff, Sharp, Sonorous
Polystyrene	Warm, Crumbly, Light
Bubble Sheets	Crackling, Semi-Transparent
Laminated Paper	Pleated, Elastic, Noisy
Wood	
Bark	Rough, Irregular, Crumbly
Veneered	Thin, Knotty
Chipboard	Compact, Pressed
Cork	Light, Warm, Streaked
Fur	
Natural	Soft, Warm, Furry
Synthetic	Soft, Warm, Hairy
Skin	Smooth, Soft
Feathers	Light, Pointed

In this context, the recommendations of the sensory design principle, which is one of the design principles that have been concluded to be the most prominent of the design principles that promote creativity, which are recommended to be implemented in the focus of Munari methodology, which increases children's interaction with the environment and supports creative thinking and learning processes, and to be taken into consideration during the project phase, are as follows:

Tactile architecture: It enables the creation of spaces enriched with surfaces and elements where children can explore different textures. The spaces created with various textural properties of different materials are also a sensory discovery space. Inspired by Bruno Munari's horizontal tactile tables (Figure 5.1), they can be applied on vertical surfaces, walls and bolder panels. Bruno Munari's Tavola Tattile number 16 in the image below and similar designs are inspirations for these proposals. Children can place ready-made module coating pieces and materials they find or create onto the panel as they wish. In this way, the wall becomes a dynamic design element in the space, where its appearance can change daily, incorporating both art and play. In order to allow children to rest their hands while experiencing the surfaces that ultimately become a design element in the space, care should be taken to ensure that there are flat surfaces in between.



Figure 5.1. Bruno Munari's Tavola tattile n° 16 (URL16)

The presentation of different materials and textures is important in this context. Various types of paper, textiles and natural objects can be used to create spaces that develop

children's sense of touch. These presentation and experience surfaces encourage children to examine the materials and create creative projects with different combinations.

Use of natural light: Observing how natural light affects different areas of the space can provide a meaningful experience for children. Glass surfaces, large windows and light shafts that allow natural light to spread evenly throughout the space play an important role in space design. Therefore, special areas for sensory interaction are important. Adding features such as glass ceilings to interior spaces can enhance the senses of hearing and vision. Soundproofing can enhance the experience of wind and rain sounds, provide an interaction with nature and support sensory exploration. In line with Munari's sensory learning approach, natural materials and the effective use of light are important parts of the design. This can be implemented indoors by adding large permeable and semi-permeable windows to support the feeling of opacity and permeability (Figure 5.2).



Figure 5.2 Example of a large semi-permeable windows taken by Jose Javier Seerano, Tokyo (URL17)

Sensory impact of colours and light: The strategic use of different colours and shades of light can enhance children's sensory awareness and interaction with space. Especially considering the effect of colours on children's emotional and cognitive states, creative solutions can be developed in lighting designs. Dynamic lighting systems and colour filters can stimulate children's imagination by giving the space a variable and vibrant atmosphere. Spaces designed to be experienced in the dark allow children to develop their

visual perception and explore different phenomena related to light. The following image shows an interaction with blue light (Figure 5.3). It offers an experience that enriches children's visual perception and encourages sensory exploration in a dark environment. In such experiences, children can observe the effect of light on textures and make connections between different tones and shades. In addition, coloured LED lights, projectors and interactive light games provide a fun and educational experience, allowing children to actively engage with the space.

Considering light and colour combinations in a holistic way in design contributes to creating environments where children can make sensory discoveries both individually and as a group. This approach transforms spaces from static to flexible and enriching learning spaces that are open to constant change.



Figure 5.3 : An experience that encourages sensory exploration in the dark taken from Joshua von Hofen (URL18)

Use of reflective surfaces: The use of reflective surfaces such as mirrors and glossy surfaces should enable children to look at the space from different perspectives. Portable mirrors also allow for the play of light and the development of creativity.

Aural designs: Environments that allow natural sounds that children can hear in their surroundings (birdsong, water splashing) and elements that optimise the acoustics of the

space should be included in the design and design phase of the space. Portable sound devices can also be used to create interactive experiences in the space. Munari's workshops on sound evolved into experiments that allowed participants to explore acoustic principles such as pitch, intensity, and duration. The workshops also encouraged the exploration of everyday objects as instruments and the listening of natural sounds such as rain or wind through leaves (Restelli, 2002).

Designs for the sense of smell and taste: Spaces should be created that allow children to explore their sense of smell and taste through food activities and the experience of natural smells such as flowers, herbs, spices, vegetables and fruits. At the project design stage, environments such as open kitchens should be designed where children can both participate in the cooking process and participate in the cooking activity and observe at the same time.

Elements inspired by nature: Branches, leaves, stones and other natural materials should be used to create spaces that allow children to connect with nature. These elements increase children's sensitivity to the environment. In addition, water pools, fountains and water playgrounds offer a natural learning environment by stimulating both tactile and visual senses.

In the context of all these principles and suggestions, it is very valuable to create sensory journey routes by creating flexible spaces for children. In this context, Flexibility is another main design principle that encourages creativity. Flexibility plays an important role in Munari's methodology. Flexible space concepts aim to create spaces that can respond to the changing needs of users in modern interior architecture approaches. With this understanding, flexible design principles that will contribute to the design of functional and multi-purpose spaces and design suggestions that can be considered during the project phase are as follows:

Areas where children can display and transform textural materials and portable surfaces offer flexibility for learning and creative play. Pathways can be created to explore different floor textures and sound reverberations, supporting children's active movement

in the space. Organisations can be designed where different activities can be carried out, supported by portable stations when necessary. This also enables the integration of natural and artificial spaces, enabling the same space to function both as a natural habitat and as a learning and play area. In this way, it also supports the issue of water and natural habitat arrangements. Pools, water playgrounds and natural elements can be reorganised seasonally or according to different needs.

Multifunctional studios and workspaces: The ability to be easily transformed for storage, exhibition or other activities should be considered when designing the space. Easy accessibility facilitates the use, organisation and access to storage areas. The use of exhibition space, which is also seen in Reggio Emilia schools and is of great importance, is also possible in pre-school education spaces with limited square metres. In this context, flexible spaces that can be changed according to user needs should be created. Furniture and modular elements that are easily movable and flexible facilitate the reorganisation of the space. This allows the space to be adapted to different age groups or activities. Independent divider modules and panels should be developed with lightness and durability in mind. This makes it possible to quickly transform the structure according to the needs of exhibitions or workshops and to reuse it for different purposes. Modular freestanding partition walls can provide flexibility to the designated areas in pre-school education spaces. Thus, it can be applied in different options according to the different sensory experiences planned. It is integrated into each module forming the dividing wall. These panels also have the task of displaying children's applications on them. Whether they are installed individually or in groups, they can offer a good tactile contrast. Modular designs can be used also in classrooms to allow children to explore spaces freely. This means rearrangeable furniture and movable changeable walls that support both individual and group work.

Lighting Flexibility: Designs that combine indoor and outdoor spaces with solutions that optimise natural light, artificial light, air flow and visual connection should be considered. The use of artificial light sources that can be moved with modular devices and the use of portable lighting elements that can change the direction of light according to the interaction of users or different times of the day will give the space flexibility in terms of

lighting. In this way, functional and mood lighting can be repositioned according to the activity and experience.

The use of portable and fixed technological tools in the space is an important part of creating interactive spaces and enriching sensory experiences. In his time, Bruno Munari drew particular attention to the role of technology in the integration of such experiences. In today's context, based on Munari's approach, the technologies of our time should be considered in experimental educational environments that support physical interaction and creativity. For example, portable projectors and mobile sound devices add flexibility to the space, enabling the creation of different sensory and interactive experiences. Portable technological tools not only provide spatial flexibility, but also offer an important opportunity to enrich sensory stimuli and support creativity. Applications with coloured light projections create a fun learning environment while increasing children's sensory awareness. As shown in the image below (Figure 5.4), this kind of experience with coloured shadows allows children to explore the relationship between light and movement.



Figure 5.4 LED Lights - Sensory and Visual Stimulation. Example from Seeing and Listening Gallery. In Exploratorium, San Francisco (URL 19)

Bruno Munari's approach to technological developments is to adapt the technology of the period as a part of education. His creative use of these tools in his workshops, inspired by the technological innovations of his time, provides important clues about today's educational environments. In order to provide sensory stimuli effectively, it is necessary

to evaluate which technologies are suitable for which user groups and space. In this context, it is of great importance to integrate current technologies into dynamic, adaptable spaces that stimulate children's senses and develop their creativity. In addition to modular wall and ceiling systems used especially for accessible and flexible designs, specially designed equipment such as LED lights, water columns, water beds, sound or vibration generating systems, projectors, aroma diffusers can be integrated into the space in a balanced and non-fixed way. In this way, special environments can be created that enrich the sensory world of children and support their learning experience.

5.2. Conclusion

This thesis focuses on design principles that support creativity in early childhood education through the methodology of Bruno Munari. The study examines how Munari's approach of integrating play, exploration and multisensory experiences can be effectively applied in educational settings to enhance children's creative development. Understanding Munari's methodology and philosophy provides clues for developing creative teaching methods in early childhood education. It also emphasises the importance of designing and planning early childhood educational buildings and environment to encourage creativity and imagination through play and art. Taking all this into account, this thesis puts forward the idea of seeing space as a multi-sensory playground. Bruno Munari's relationship with the Montessori and Reggio Emilia educational approaches is evident in their common emphasis on creativity, the use of a variety of materials to encourage discovery and learning, the philosophies of learning by experimenting and doing, and a child-centred approach to education. Applying these principles in early childhood education settings involves designing spaces that are flexible, sensory-rich and conducive to exploration. By creating environments that reflect Munari's principles, we can support the development of creative, independent and critical thinking skills from early childhood. Munari's experimental and sensory approach workshops stand out as spaces that allow children to actively use their five senses and freely express their creativity. So, this thesis puts forward the idea of seeing space as a multisensory playground and it offers important clues for the application of the principles of sensory design and flexibility for space design in the field of early childhood education that foster

creative learning processes. These recommendations focus on how spaces can be designed to support children's sensory exploration and creative thinking processes. It suggests that the spatial design of pre-school education spaces, especially those with limited access to nature, should integrate sensory elements to significantly support children's creativity.

Bruno Munari's relation on Montessori and Reggio Emilia education is evident in their shared emphasis on creativity, exploration and the use of diverse materials to stimulate learning. In this context, this thesis considers the methodology of Bruno Munari, an influential Italian artist and designer, whose work is seen to have strong similarities and relevance to creative educational approaches such as Montessori and Reggio Emilia, emphasising the importance of creativity, play and exploration in learning. This is closely related to the principles of educational methods. In this context, it aims to focus on the impacts of Bruno Munari's methodology in spatial design, which is proposed to support children's creative abilities. This thesis examines the design elements that promote creativity in early childhood education in a multisensory context, focusing on Bruno Munari's methodology. The study examines how Munari's approach of integrating play, exploration and multisensory experiences can be effectively implemented in educational settings to enhance children's creative development. Understanding Munari's methodology and philosophy provides clues for developing creative teaching methods in early childhood education. It also highlights the importance of designing and planning early childhood educational buildings to foster creativity and imagination through play and art.

The principles of sensory design, which emphasise the use of a variety of surfaces and materials to develop children's sensory perceptions, are primarily in line with Munari's methodology. Munari's approach emphasises the power of sensory engagement in developing creativity. His methodology, based on deeply hands-on experimentation and artistic play, emphasises the importance of creating opportunities for children to interact with materials in an open-ended way. Children are invited to explore sensory experiences such as manipulating textures, observing light, shadow, nature and interacting with colours and patterns through workshops developed by Munari himself and his successors,

which he calls Laboratori. These workshops emphasise how structured, interactive play can develop sensory awareness, critical thinking and creative problem solving. Munari's methodology prioritises hands-on experimentation and sensory engagement, as exemplified in his interactive workshops. These workshops demonstrate how structured yet open-ended activities can spark children's curiosity, encourage independent thinking and develop their problem-solving abilities. They offer practical frameworks for incorporating sensory exploration into early childhood education, particularly by blending tactile, visual and auditory stimuli with artistic processes. The role of these workshops extends beyond mere artistic expression; they serve as practical models for integrating sensory and creative learning into preschool settings. For example, tactile exploration of everyday objects not only stimulates sensory perception, but also stimulates curiosity and imagination, encouraging children to re-imagine their world. Munari's laboratories demonstrate that creativity is not only a skill to be taught, but a process to be nurtured through sensory-rich, participatory experiences.

This approach involves bringing together different textures, colours, light and sounds in the space. Creating spaces that stimulate children's five senses makes learning more interactive and meaningful. In this context, inspired by the workshops developed by Bruno Munari and his successors, dynamic designs that enrich children's senses and therefore their creativity are proposed. Furthermore, based on Munari's methodology, combinations of natural light and colour support children's learning processes by increasing their sensory awareness. The importance of the use of natural light is emphasised. Large glass surfaces, light shafts and appropriate sound insulation allow children to establish a stronger connection with the natural environment.

Flexibility in space design is equally important. Providing children with a variety of spaces and materials in which to engage in different activities enables them to interact with their environment in a meaningful way. This is not only about the physical organisation of the space, but also about the social and cultural interaction it contains. It is concluded that space design should be multifaceted and coherent to support children's sensory and cognitive development. For example, classrooms can be designed with modular furniture that can be easily reconfigured to suit different activities such as group

work, individual exploration or artistic expression. Elements such as textured and lightweight wall coverings, interactive flexible lighting designs and movable partitions can provide both flexibility and sensory stimulation. In addition, integrating elements that incorporate colours, elements and sensory nature experiences inspired by the outdoors can compensate for limited natural access. In this way, children can develop a deeper connection with nature and creative play can be encouraged. It is possible to plan and design early childhood education structures and interior design elements with a focus on sensory design and flexibility, as well as using elements of technology and nature to stimulate creativity and imagination through play and art. Accordingly, for example, classrooms should be equipped with a variety of materials and technologies for artistic and tactile experiences, interaction with nature should be encouraged, and educators should be trained as companions and observers to facilitate rather than direct learning.

Taking all these into account, all these recommendations aim to create flexible and sensory-rich learning environments that are conducive to children's learning and creativity processes. These design principles offer a comprehensive understanding of how space can be used as a tool in early childhood education and can help to maximise the creative potential of children, in line with Munari's pedagogical approach. In this way, by interacting in space, children can both participate in the creative process and establish an ever-changing connection with their environment. By creating environments that reflect Munari's principles, we can support the development of creative, independent and critical thinkers from an early age. Munari's workshops with an experimental and sensory approach to materials and technologies stand out as spaces that allow children to actively use their five senses and freely express their creativity. As a result, understanding Munari's methodology and philosophy provides clues for developing creative educational methods in early childhood education. Focusing on Bruno Munari's methodology, since it is important to see space as a multi-sensory play and art space within the framework of design elements that support creativity in early childhood education, classrooms should be equipped with a variety of materials and technology for artistic and tactile experiences, interaction with nature should be encouraged, and educators should be trained to facilitate learning rather than direct it. Traditional education systems need to harmonise this interactive learning by translating theoretical knowledge into practice and real-life

activities. By combining art, play and carefully designed environments, educators and designers can create spaces where children's innate creativity flourishes. Understanding Munari's methodology and philosophy provides important clues to better design and develop environments for creative teaching methods in early childhood education.

This research provides valuable insights for professionals and organisations seeking to design and develop environments that enhance creativity, sensory exploration and well-being, particularly in early childhood education. By applying Bruno Munari's methodology to the principles of interior design, this thesis serves as a resource for the following key groups:

- i. Interior designers and architects who specialise and wish to specialise in child-centred spaces such as pre-school education spaces, childcare units and creative play environments.
- ii. Furniture designers focussing on multi-sensory development orientated solutions for educational and play environments.
- iii. Designers and developers of educational materials and play tools aimed at stimulating creativity and sensory development in children.
- iv. Early childhood education organisations seeking guidance on creating inspiring and flexible learning environments
- v. Policy makers and public authorities responsible for shaping regulations and standards for educational spaces and programmes.

This thesis not only bridges the gap between design theory and practice, but also offers practical suggestions and a new method for creating environments in line with Munari's principles of creativity and discovery. It serves as a guideline and set of principles to inspire and inform the work of various professionals contributing to the fields of education and design.

5.3 Limitations of the Research

This thesis has made significant contributions and provided valuable insights by focusing on Bruno Munari's methodology and the design principles that encourage creativity in early childhood education. However, it is equally important to address the limitations encountered during the research process.

Firstly, due to location constraints, on-site observations and in-depth field studies of Munari's workshops and educational spaces could not be conducted. Such observations could have provided more detailed insights into the practical implementation of his methodology. Secondly, it was not possible to conduct detailed, face-to-face interviews with educators, designers, practitioners, or Munari's successors who have applied his methodology. This limitation may have restricted a deeper understanding, discussion, and exemplification of the lived experiences and applications of Munari's principles in physical environments. Lastly, and most importantly, the issue of literature sources must be noted. While this thesis aims to explore Bruno Munari and his methodology within the broader context of early childhood education, it also seeks to draw insights from widely recognized approaches such as Montessori and Reggio Emilia, aiming to position Munari's methodology as a framework for designing early childhood education environments. Rather than a direct comparison, the study provides a foundation for understanding Munari's unique contributions. It opens new pathways for their application in related disciplines such as child development and design. However, Munari's methodology is underrepresented in international literature compared to Montessori and Reggio Emilia. This made it challenging to incorporate a robust critical discourse or include diverse external perspectives in the analysis. Additionally, Munari produced most of his works in Italian, which limited the accessibility of his ideas in international academic literature. However, the researcher's proficiency in Italian helped overcome this challenge, enabling a thorough exploration of his original texts. Moreover, access to resources related to Munari from Turkey was also limited.

Despite these limitations, this thesis has laid a foundation for integrating Munari's methodology and principles into the design of rich environments that foster children's

creativity. Future research can address these gaps and build on the findings presented here.

5.4. Suggestions for The Future Research Directions

This study can serve as a starting point for exploring the following topics, potentially opening new avenues for those interested in issues related to sensory development and creativity. In addition, based on this study, the following recommendations can serve as a guide for researchers interested in further exploring Munari's contributions and expanding the role of sensory design in the field of early childhood education and developing new ideas that can contribute to different disciplines:

Conduct on-site observations of spaces designed around Munari's methodology to gain a better understanding of its practical application and outcomes. This can be facilitated through in-depth interviews with educators and designers who actively apply Munari's methods in their work.

By further exploring Munari's approaches in a pedagogical context and their significance in the field of design, wider applications such as adult education can be investigated. In this way, work can be done on how the principles of sensory design can be integrated not only with children, but also with adult education and professional development. In addition, the impact of sensory design orientated workshops and learning environments for creative professionals could be explored.

Comparative studies can be conducted to determine the similarities or differences between Munari's methodology and other pedagogical approaches.

Experimental studies can be conducted through observations and questionnaires to examine how sensory design elements such as light, colour, texture, sound encourage creativity and sensory exploration in early childhood educational environments. The effects of playgrounds and learning centres that focus on children's sensory experiences can be investigated.

The effects of sensory design in the context of neuroscience, neuro-architecture and space perception can be investigated. A bridge can be established with disciplines such as architecture, interior design, educational sciences and child development. In this way, the role of sensory stimulation on different skills and abilities can be better understood and multidisciplinary applications of sensory design can be explored.

The effects of sensory design for atypical children with special educational needs can be investigated. Thus, how to design effective environments can be examined.

Studies examining the integration of sensory design with virtual and augmented reality technologies can be conducted. This could help to understand how sensory stimulation can be optimised in digital educational environments.

These research proposals can contribute to researchers and designers who want to evaluate sensory design and creativity-oriented pedagogical approaches from a broader perspective and create diversity in practice.

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CURRICULUM VITAE

Begüm AYTAÇ GÖZCÜ

Academic Background

Master	2020 - 2025	Kadir Has University (%100 scholarship) MA in Design
Associate Degree	2020 - 2025	Anadolu University AÖF Retail Sales and Store Management
	2015 - 2020	Atatürk University AÖF Child Development
Bachelor's Degree	2010 - 2015	Kadir Has University (%50 scholarship) Interior Architecture & Environmental Design
	2014	Falmouth University – United Kingdom BA (HONS) Interior Design
Highschool	2005 - 2010	Galileo Galilei Italian Highschool

Foreign Languages

English	Advanced
Italian	Advanced
Spanish	Intermediate
Latin	Elementary
Japanese	Begginer

Work Experience

04.2021 - 12.2021

MVoice Interior & Contract

Interior Architect & Sales Manager

09.2020 - 04.2021

Lazzoni

Interior Architect Assistant Project Manager

10.2017 - 09.2020

IKEA Kartal - Interior Design Specialist

Showroom areas, IKEA Restaurant Design, Application Projects, Area Change and Applications

2018

IKEA Ankara

Showroom Design application project

2019

IKEA Antalya – Store Establishment

Showroom, Store Office Areas, Construction Site, Application

10.2017 - 04.2018

IKEA Kartal – Store Establishment

Showroom Areas, Ikea Restaurant Section Design-Projecting-Application Accessorizing-Proping

04.2016 - 07.2017

DB Architects

Univa Student Housing Campuses

Dorm Rooms: Concept Study + Planning + Implementation

House B, Ukraine

Design + Implementation Project

Osmanlispor Stadium

Lounge Design

Bjk Esentepe Gerede Hotel

Plan Revision + Room Designs

Emlak Konutları Nigde

Floor and Entrance Halls Design + Application Project, Wet Space Application P.

Emlak Konutları Kayapark

Floor Halls, Entrance Halls, Social and Sports Facilities, Hotel Rooms, Wet Space Types Design + Implementation Projects

Hosdere School

Wet Volume Types Application Project

Kelesoglu Fikirtepe

Housing Apartment Plans + Detailing

09.2015 - 04.2016

M-Ofis Architects

Zeytinburnu Abdi İpekçi Sports Hall Surroundings Kentsel
Donusum Project

Gayrettepe, Hilton Garden Inn Hotel Concept Study

Zeytinburnu, Kazlıçeşme Shopping Center Project

2015

Freelance

Kısık Hotel - Digital Advertising, Banner Design

06.2014 - 08.2014

M-Ofis Architects - Intern Interior Architect

Ibis Hotel, Konya, Entrance Lobby Design, Three
Dimensioning, Plan Painting

Novotel, Konya, Room and Hall Designs, Three Dimensioning

AWARD / EXHIBITION / WORKSHOP

2019

Sustainable Lighting Design Workshop, ENTA (Industrial Designers Association),
Teamwork, Top Three Designs Selected for Exhibition

2014

2nd Istanbul Design Biennial, Future of Learning Spaces, Cibali Primary School Project

2014

10th Anniversary Exhibition of Kadir Has University Faculty of Art and Design,
Cibali Primary School Project, Selected for Exhibition

2013

Sustainable Designs Competition, ModuleMat

Participant, Published in the Booklet

2012

International Workshop, Design Campus 2012 - Acoustic

10th "Turkish and German Designers Workshop"

Zukunft durch Herkunft (Tradition Shapes the Future)

2004

Lions Club "Create a Bright Future" Painting Competition (Honorable Mention)

2003

International Lions Poster Competition (Participation Certificate)

2003

Şişli Municipality Cultural Department "Teacher's Day Composition Competition"

1st Prize

2001

Güneş Art Gallery, Personal Painting Exhibition

2000

Mon AMI "Children and Environment Painting Competition"

Achievement Award

1999

Şişli Municipality "World Environment Painting Competition"

3rd Prize

COURSES / CERTIFICATES

2020

Strategic Networking Training, Kariyer10.Kat

2019

Graphic Communication in Sales Areas Training, IKEA

Time Management Training, IKEA

Stress Management Training, IKEA

Bathroom Planning and Accessorizing Certificate, IKEA

Lighting Training Certificate, IKEA

Bedroom - Wardrobe Planning Certificate, IKEA

2010

Bülent Gürcan Painting Workshop

2009

Sami Canel M.S.U Alumni Association Drawing Course

2006

KOINE - Florence Italian Language Course

2002-2004

Pera Fine Arts, Flamenco Guitar

ASSOCIATION / ORGANIZATION

2013-2015

Founder and President of Kadir Has University Environment and Ecology Club