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BEDROOM FURNITURE FOR PRESCHOOL CHILDREN ACCORDING TO THE CHILD'S DEVELOPMENT

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ABSTRACT

In this thesis, the design considerations of a healthy and stimulating bedroom environment for preschool children are analyzed. In order to build up a multipurpose environment, the development of preschool children, the necessary items of furniture and the related design concepts are discussed. General design criteria are determined to constitute a guide for preschool children's bedroom environment. In the light of these data, a research is conducted to analyze children's development.

Key words: Bedroom Environment for Preschool Children, Bedroom Furniture for Preschool Children, Child Development, Design Criteria, Plywood Material, Artisan Wooden Joinery

1. INTRODUCTION

This research was carried out in order to determine the requirements for healthy bedroom furniture for preschool children, which engenders their motivation and affects their development positively. Since designing for children is a completely different endeavor; choosing the right furniture specially designed for children and the design criteria for this chosen furniture should be analyzed in accordance with children's particularities and traits.. (Nikoljski,2012)

Since children have a great amount of energy; they have to spend this energy in a safe and healthy environment. According to Sinnot, the first of the two vital facts to remember when designing for children is that children use built environment differently than adults. They run rather than walk and use parts of the environment as play equipment (Sinnot, 1985).

The other vital fact to remember as stated by Sinnot is that body proportions of children differ considerably at different ages. The ratio of length of legs to total height varies from 1:3 in newborns to 1:2 in adults; at birth the ratio of vertical head height to total height is 1:4, whereas in adults it is 1:7 ½. Horizontal dimensions of the head in small children exceed the maximum body depth. This leads to accidents where a child slips feet first through an opening and being caught by the head (Sinnot, 1985).

Children's bedroom is a space which builds up a foundation for the future. That is its essential quality. It is a room which takes the broadest demands as a starting point that is made on contemporary habitats, because the child has to live fully in preparation for tomorrow and the present has its roots in their immediate environment where their identity takes shape.

Child development is a body of knowledge constructed by adults to be used by the other adults in order to make sense of regulating and promoting children's lives and learning (Woodhead and Faulkner, 1987).

Researchers have profoundly investigated the understanding and prediction of children's spatial perceptions and behavior. Piaget's investigations of spatial understanding (Piaget and Inhelder, 1967) have strongly influenced what is believed about children's environmental context (Ziegler and Andrews, 1987).

As Piaget and Inhelder stated, assimilation and accommodation are two basic strategies used by young children to perceive and learn the environment. In case that experience, perception, or information is accepted, it is assimilated. If it does not fit, the mind may change previous knowledge to new knowledge that is able to accept or accommodate the information or experience. Accommodation occurs when a previously learned response fails to work in a new situation. When balance occurs between these two functions, development of intellect takes place. Therefore, the relation of a young child with the environment is a process of assessment and construction (Piaget and Inhelder, 1967).

2. MATERIALS AND METHODS

The goal of this project is delivery of a report on the design aspects of children's bedroom environment and furniture that may contribute to the development of children positively, together with finding out whether these aspects can be used in forming their design criteria together with an investigation of the characteristics of today's children behaviors.

The method used within this research is analysis of literature and researches in the field of children's behavior and children's bedroom. A literature review was done in order to gain an understanding of the child development and why a bedroom is needed in a child's life, with an analysis of its components.

Simplicity should be the aim of design. Functional design doesn't need to be complicated. There are a few contemporary producers of furniture design in the field of child's bedroom, who are finding new solutions for materials and construction. In the field of design they collaborate with talented designers from across the globe to bring original design from the creators themselves.

Quality craftsmanship is important. Sustainable thinking is an ideology that affects the field of child furniture in every way. All wood used in production of today's products, for example, is sourced from sustainably managed and harvested forests, and unique joinery systems allow most products to be shipped to you flat-packed - which means less transport emissions and positive progress for our environment.

3. RESULTS AND DISCUSSION

3.1. Child development, characteristics of preschool children

While children grow up, their needs and expectations change in accordance with their physical and psychological development. Children have different pleasures, performances and characteristics in every developmental period. Therefore, it is important to consider the characteristics of children in different age groups when making inferences about the quality and property of their environment. (Nikoljski, 2012)

Researchers studying development of children generally divide childhood period into four stages (Clarke-Steward and Friedman, 1987; Fogel and Melson, 1988; Craig, 1989): infancy, early childhood/young child (preschool period), middle childhood, adolescence.

These stages, which are shown in Table 2.1, correspond to Piaget's stages of cognitive development. According to Piaget's theory (cited in Clarke-Steward and Friedman, 1987), children are ready to adapt and to learn the world by birth. They do not have to be taught deliberately to walk or that objects have to obey certain physical laws and people have to obey moral rules. In his opinion, children build up knowledge as they mentally organize information from the environment.

Children actively participate in their own development. They manipulate and explore their world, and they are guided by mental structures or mental representations of how things work.

Table 1. Piaget's stages of cognitive development

(Clarke-Steward and Friedman, 1987) Stage	Activities and Achievements
Sensorimotor Birth to two years	Infants discover aspects of the world through their sensory impressions, motor activities, and coordination of the two.
Preoperational 2 to 7 years	Child cannot yet think by operations, by manipulating and transforming information in basic and logical ways. They can think in images, symbols and form mental representations of objects and events.
Concrete Operational 7 to 11 years	Children can understand logical principles that apply to concrete, external objects.
Formal Operational Over 11 years	Adolescents and adults can think abstractly. Their thinking is no longer constrained by the given of the immediate situation but can work in probabilities and possibilities.

3.2 Motor development of children

Motor coordination in young children develops along with muscular strength and speed. This refers to the skills involved in coordinating physical movements. Through active play, young children learn to channel strength and speed into smooth, accurate movements. In this period of their lives, children are curious, energetic and eager and they love to climb, run, and jump. This vitality in movements enables children to master the ability to regulate their behaviors. These gains in self-regulation in movement are part of a general trend toward greater self-control in all areas of development.

The major milestones of motor development from age two to six are summarized in Table 2.2.

Table 2. Milestones of motor development during early childhood

(Cratty and Bryant, 1979) Age	Selected behavior
2 years	Walking rhythm stabilizes and becomes even Jumps crudely with 60 cm takeoff Will throw small ball 120-150 cm True running appears Can walk sideward and backward
3 years	Can walk a line, heel to toe, 3m long Can hop from two to three steps, on preferred foot Will walk balance beam for short distances Can throw a ball about 3m
4 years	Running with good form, leg-arm coordination apparent, can walk around periphery of a cycle Skilful jumping is apparent Can walk balance beam
5 years	Can broad-jump from 60-90 cm Can hop 15 m in an about 11 seconds Can balance on foot for 4-6 seconds Can catch large playground ball bounced to him or her
6 years	Girls are superior in movement accuracy; boys are superior in forceful, less complex acts. Skipping acquired. Throwing with proper weight shift and step.

3.3 Children's world: Cognitive development of children

Children perceive the world in a different way. According to Fogel and Melson, for children the world is:

- Syncretic: Children perceive everything in a global approach, mixing recollections, desires, dreams and reality.
- Egocentric: The world and the child are mixed. He/she thinks that other people think like him/her.
- Magic: Children confuse the signifier and the signified (e.g. Touching the moon's name means touching the moon itself.), the internal and the external (Humans think through the mouth.). Children think they can have an influence on the world with magic practices: to stop breathing to avoid something, to avoid walking on the lines etc.
- Animist: They perceive everything, even objects, as if they were alive.
- Finalist: Everything has a function, and usefulness (Night is for sleeping, a mountain is for climbing, etc.).
- Artificialist: God or people have built everything (A river is built with water and earth) (Fogel and Melson, 1988).

3.4 Social development of children,

Ross D. Parke, in her article "Children's Home Environments: Social and Cognitive Effects", shows that from a very early age, variations in the social environment of the home have an impact on a child's cognitive and social development. The amount, type, and timing of the social stimulation provided by the social agents in a child's home are important determinants of his later development. Parke emphasizes that young children live in a complex social environment composed of mother, father, siblings, peers, and relatives. All of these agents play an important stimulatory role in a child's early development (Parke, 1980).

A child's physical environment is formed by a few basic spaces: home and surroundings of home such as playground, street, shop, and school environments. A child, as the youngest member of the society, develops in this environment. A child's physical environment, which is mostly created by adults with adult understanding, is the world of small objects within a world of bigger objects. Broad imagination capability of the child uses every object, as a raw material to recreate his own world, despite the fact that the environment had been well prepared or half-prepared by adults.

Observations show that children use the built environment in an amazingly different manner than adults. "Young children, so imaginative in their own spheres of actions, may look matter-of-factly on places than to adults are haunted by memories" (Tuan, 1977: 33). Ziegler and Andrews point out the fact that children may perceive their environment realistically as a necessity or an experience, but their use of environment depends on their unlimited imagination (Ziegler and Andrews, 1987). For example, a child may use an environment just like a play material in a manner that the designer had never planned. Environments for children, to live in, learn in, and play in should give opportunities for children to make their own decisions. Otherwise, children find out ways against the limitations with their imagination. Children are often able to adapt themselves to the existing environment and change the environment according to their desires.

3.5 The importance of the bedroom

The bedroom has grown in importance in terms of its role in the heart of the home. According to Lawrence (1985), one third of one's life is spent in this room. He emphasizes the fact that the bedroom is no longer a room strictly reserved for sleeping. The room becomes a place whose use has been extended to other activities that take place at other times of the day: reading, playing games, conversation, work, enjoying television or video, music, etc.; a whole world of new customs and leisure pursuits have taken over in the bedroom and this is reflected in the furniture.

Sleeping, as the main activity of a bedroom, although an unconscious activity, is no less important than other aspects of living (Davis et al., 2000). Getting a good night's sleep is vital in fact in order to have a healthy growth process. Moreover, at least one large room should be furnished in such a way that furniture can easily be moved aside to allow active play providing for children's gross

motor activity within the home. In addition, researchers have interviewed children and their parents about their use of space within their house, which allowed description of the home as a set of territories, each of which has a particular pattern of behavior and attitudes. Some portions of the home are clearly effectively controlled by a single individual; some are shared by a sub-unit of the family; some are public areas, controlled by all; and some are described as mother's jurisdiction areas - kitchens especially were so described - being used by all, but under mother's control. Those children who shared all areas and had no conclusive use of one part of the home, felt no place in the home was available to them as primary territory (Spencer, Blades and Morsley, 1989).

The rooms especially designed and separated for children constitute an inconsiderable part of their environment (Parke, 1980). In their room, they go to bed and wake up; they spend some part of every day. Their rooms determine the things they see and find for amusement and instruction. Therefore, it is obvious that their rooms have an effect on their present and subsequent behavior.

3.6 Bedroom as a source of stimulation

There is an increase in child-care environments outside the home for infants and young children. However, the home environment remains a principal setting in which the child's early social and cognitive development takes place, which has a marked impact on his later social and cognitive development.

Direct and indirect forms of stimulation include a social stimulation provided directly by social agents, and physical stimulation provided directly by furniture, toys, books and other physical objects, as well as some indirect influences whereby the social and physical environment is mediated by the action of another social agent (Parke, 1980).

Olds draws a similarity between the child bedroom and the other rooms of a home, which support different functions, moods, body postures, number of occupants, and levels of interaction. Children's environments must provide uniqueness, privacy and stimulation (Olds, 1987). Qualitatively different areas for active versus passive, noisy versus quiet and messy versus clean activities make a space more manageable for adults and more interesting and interpretable for children.

3.7 Activities in the bedroom

The design of any children's space must be based upon the functions and activities of the room's occupants. Therefore, one should begin by listing all the activities, materials, and events that must be accommodated. According to Egill (2002), the activities that are done in a child's bedroom for the pre-operational period are divided into three, being sleeping, playing and tidying-up.

3.7.1 Sleeping

Sleep is vital to human organism. No one can do without sleep, and children require more sleep than older children or mature adults. Most of the standards require that all children have the right to possess their own sleeping space and bedding. Moreover, Greenman (1988) describes sleeping activity as a "given" activity, something that children have to do. What is not given is the sleeping space that depends on regulations, parent preferences (children's preferences more rarely) and storage. Most of the preschoolers need about 12 hours of sleep per day to grow well and to feel rested, alert, and energetic. However, in the first months and years of their lives, children are expected to sleep even 17 up to 20 hours per day. Sleep is not continuous but rather a series of long and short naps (Harris, 1985).

Sometimes children get up before the rest of the family do. Even in a childproofed home, preschool children can get into trouble if they are left unattended. Locking children in their rooms is not really a solution; instead, having a play area or some furniture and toys to hold the attention of the children can be the best solution for this problem.

It is important that up to age 3 children should take an afternoon nap for about an hour (Olds, 1987). Naps can be discontinued once children begin to resist going to bed in daytime and demonstrate that they can function well until bedtime without the additional rest. It is useful to intersperse quiet

times among periods of activity. Parents and children might read, draw, color, watch TV, or just talk during quiet time.

3.7.2 Playing

Research done on children for many years has shown that children are in need of playing as much as doing all the other important necessities as part of growing up. Since it is very difficult to separate the process of playing and the function it performs in a growing child, there is no simple and one-sentence definition that explains what play is.

Philosophers and educators have been interested in children's play for centuries. Heseltine and Holborn divide the development of play into two parts; ancient times and modern times. Ancient times have also been analyzed from viewpoint of the philosophers and the educators.

1. Ancient times

- Philosophers
 - Plato and Aristotle believed that play was essential for healthy development of children.
- Educators
 - Comenius, Rousseau and Frobel commented on the importance of play in a child's life.
 - Schiller explained play in terms of surplus energy.
 - Groos saw play as a rehearsal of adult survival skills and pointed out the importance in developing motor skills.
 - Patrick explained play in terms of relaxation from mental tiredness.
 - Gulich and Hall defined play as a recapitulation of man's evolution.

2. Modern Times

- Freud saw play as a means by which children assimilate experiences.
- Erikson developed Freud's theories, seeing play as an important part of the developmental process, by which children acquire new and more complex knowledge.
- Young saw the importance of play during the development play.
- Piaget stated that a child first engages mainly in the practice play, later in symbolic play and finally in games with rules.
- Parten observed preschoolers as progressing from unoccupied behavior through the stages of solitary, parallel, associative and cooperative play.

Selfridge (1999) points out the effects of play that promote children development in five main domains. The first one is physical development. There is a progress both in fine and gross motor skills. Through running, jumping, and throwing they can practice their motor skills. On the other hand, when they play with toys, they use fine motor skills for putting puzzles together, coloring, block building etc. The second domain is cognitive development. Play enhances cognitive development. Rich play correlates with creative thinking. Play improves imagination, creativity and also promotes memory and use of memory strategies. According to Vygotsky, children develop the "ability to separate thought from actions and objects" through play (cited in Selfridge, 1999). The third domain is communication development which refers to the process of negotiation and planning that takes place during play. Children learn how to communicate their ideas and intentions to one another and how to verbally resolve disputes. Their emerging interests in language and literacy are reflected in their play. The fourth domain is social development, as Heseltine and Holborn describe the development of the "self" idea in relation to the environment and others (Heseltine and Holborn, 1987). In play, children practice skills like getting along with others, entering groups, sharing and taking turns. They continue to develop social relationships with adults and peers and establish friendship through play. The last effect of the play on child development is that play helps children develop emotionally. They develop self-esteem and their own self-concept. They learn to deal with fears and stress, and to identify their emotions (Frost, Wortham and Reifel, 2001).

Table 3. Compares the theories of Parten and Piaget (Heseltine and Holborn, 1987)

(Fogel and Melson, 1988)		Description
Stage of play		
PIAGET	Practice play	Repeated movements to consolidate, perfect, or elaborate a skill. Example: Going down a slide. (First, down the right way, feet first. Later, down backwards or head first.)
Symbolic play		Play in which one thing stands for another. Example: Playing house. (Child uses play materials to represent some imaginary thing.)
Games with rules		Play involving rules and competition between individuals or groups. Example: Hide and seek.
PARTEN	Solitary play	Child plays alone. Example: Child sits alone in the sandbox and fills pail with sand.
Parallel play		Play in close proximity to other children but without interaction. Example: Two children sit next to each other in a sand box, each filling a pail.
Associative play		Children respond to each other during play but maintain separate goals. Example: Two children talked to each other while playing with sand in a sandbox.
Cooperative play		Play is organized around joint activities. Example: Two children work together to build a sand castle.

- Environmental factors of the space available for play; how the space is arranged, and the toy and equipment selection for this space, can have a considerable impact on children's play behavior. Setting can influence the type, amount, duration, and quality of children's play activities (Wardle, 1999). According to Heseltine and Holborn (1987), the quality of the play depends on five criteria:
- Time: The more time a non-repetitive play activity lasts and holds the attention, greater the play value.
- Change: The greater the ability of the playground and the equipment to be changed, the more possibilities are offered to the child, and therefore the greater the play value.
- Challenges: The more opportunities the playground has to offer an increasing level of challenges to children, the greater the play value.
- Suitability: The more the playground can match different ages and needs at the right time, the greater the play value.
- Cooperation: The more the playground can stimulate co-operation and group play, the greater the play value.

3.7.3 Tidying-up

Egill (2002) defines tidying-up as an informal learning activity. Since an invitation to a child to play is communicated primarily by visual presence of play materials, good storage is essential. This activity teaches children about relations between things (Greenman, 1988). At the beginning, things in a child's environment should be organized by the adults themselves in a way children understand. Then the adults are suggested to expect children to maintain an order. Moreover, it teaches children to take responsibility for things, and tidying-up the things to storage units, develops the children's motor and social skills. The act of transporting buckets with handles, baskets, trays and different size containers are all different activities in themselves and storing materials in a container that requires two or more children for transport stimulates cooperative activity. On the other hand, defining the nature and/or location of the activity by the color, shape material (wood, metal, etc.), can build in classification and develop an order that children can understand and help to tidy-up.



Figure 1. Child furniture for babies, small children and preschool children with a different concept, project, material, without metal joins. Simple, honest design and beautiful natural materials are the hallmark of functional and lasting design. (www.plyroom.com, 2016)

The Playroom children's furniture collection is original, contemporary and sustainable design in the field of children furniture. The natural palette of pieces ensures that child's room can reflect child tastes. This furniture is made of Blonde Scandinavian Birch which works perfectly with grown up colors such as black and white and additional accent colors, and can really give a modern, sleek feel to

a child's room. Functional and intelligent design also means that children won't outgrow their bedroom.

These beds are created using low VOC finishes, and pressed wood sourced from responsibly managed European forests. Plywood beds and bunks do not have metal screws or joins, instead using a precision cut joinery system and artisan wooden joinery components. The combination of natural materials and intelligent design creates a calming environment, maintains child's connection with the environment and stimulates creative play. (www.plyroom.com, 2016)

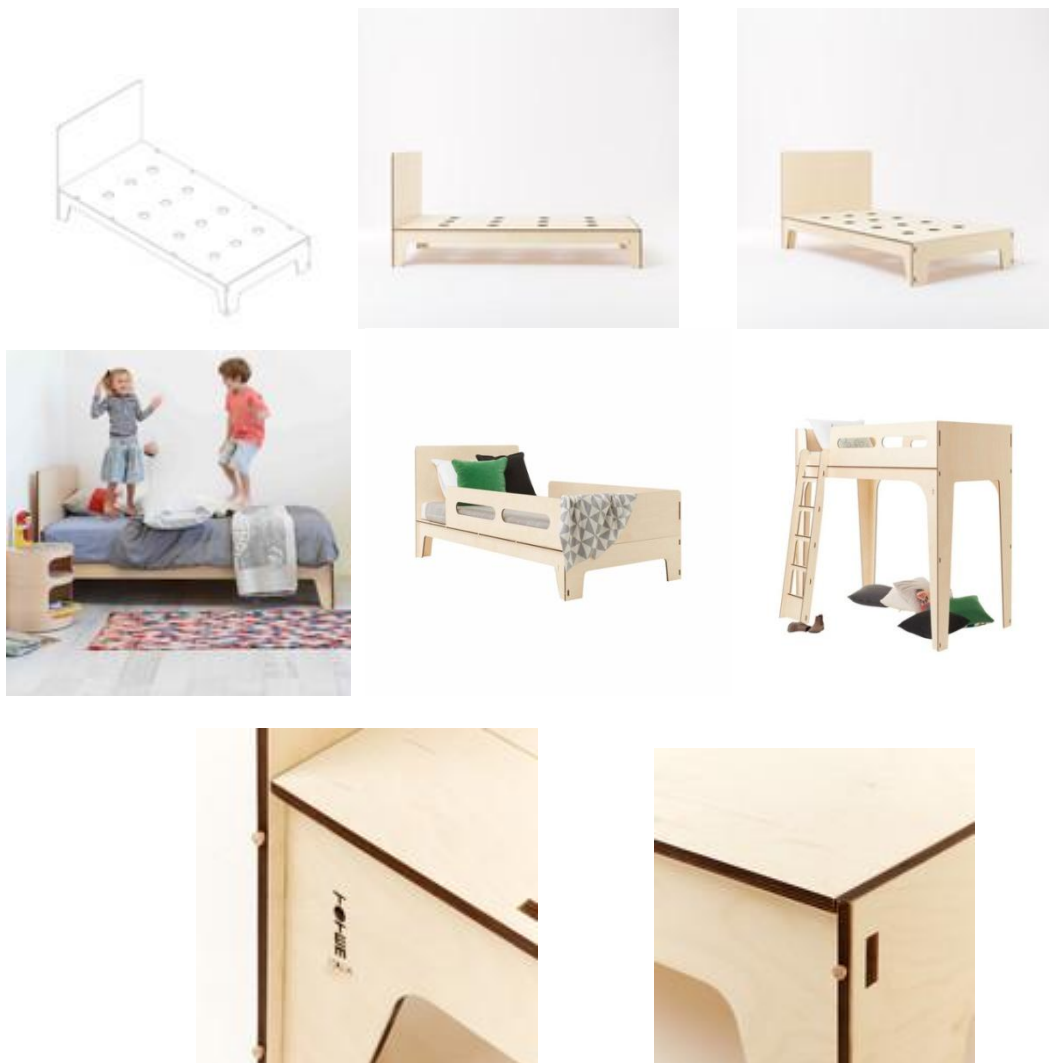


Figure 2. Child furniture for preschool and school children with a different concept, project, material, without metal joins. (www.plyroom.com, 2016)

Simplicity should be the aim of design. Functional design doesn't need to be complicated. There are a few contemporary producers of furniture design in the field of child's bedroom, who are achieving new solutions for materials and construction. In the field of design they collaborate with talented designers from across the globe to bring original design from the creators themselves.

Quality craftsmanship is important. Sustainable thinking is an ideology that has influenced the field of child furniture in every way. All wood used in production of today's products, for example, is sourced from sustainably managed and harvested forests and unique joinery systems which allow most products to be shipped to you flat-packed – which, in turn, means less transport emissions and positive progress for our environment.

Versatility through design today means products not only sustainable in their creation methods, but that can be sustainable in their versatility, too. Child furniture should inspire creativity, flexibility and freedom.

Plywood is a sheet material manufactured from thin layers or "plies" of wood veneer that are glued together with adjacent layers having their wood grain rotated up to 90 degrees to one another. It is an engineered wood from the family of manufactured boards which includes medium-density fiberboards (MDF) and particle board (chipboard).

All types of plywood bind resin and wood fiber sheets (cellulose cells are long, strong and thin) to form a composite material. This alternation of the grain is called cross-graining and has several important benefits: it reduces the tendency of wood to split when nailed at the edges; it reduces expansion and shrinkage, providing improved dimensional stability; and it makes the strength of the panel consistent across all directions.

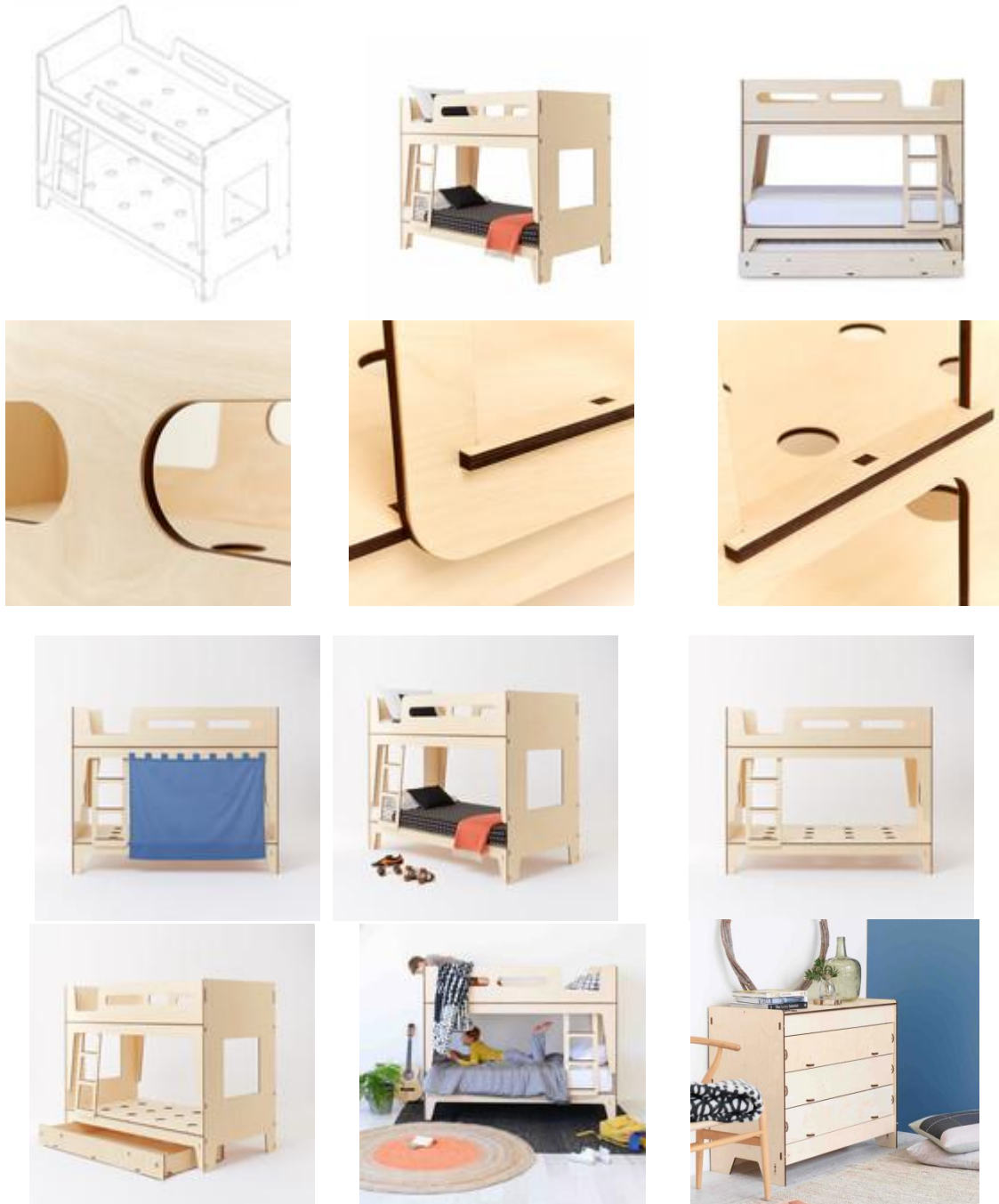


Figure 3. Child double bed with a different concept, project, material, without metal joins (www.plyroom.com., 2016)

There is usually an odd number of plies, so that the sheet is balanced—this reduces warping. Because plywood is bonded with grains running against one another and with an odd number of composite parts, it is very hard to bend it perpendicular to the grain direction of the surface ply. A typical plywood panel has face veneers of a higher grade than the core veneers.

The principal function of the core layers is to increase the separation between the outer layers where the bending stresses are highest, thus increasing the panel's resistance to bending. As a result, thicker panels can span greater distances under the same loads. In bending, the maximum stress occurs in the outermost layers, one in tension and the other in compression. Bending stress decreases from maximum at face layers to nearly zero at central layer. Shear stress, by contrast, is higher in the center of the panel, and zero at the outer fibers.

4. CONCLUSION

4.1. Concepts for developing bedroom environment for children

While children's settings vary in purpose and philosophy, there are environmental dimensions that apply to all settings and are useful analytical tools. There are nine important dimensions of children's settings (Greenman, 1988).

- **Softness:** A soft, responsive, physical environment reaches out to children. It helps children to feel more secure, enabling them to recharge. Since so much of the children's learning is sensory-motor based and requires hands-on experience, softness has an educational purpose. The younger the child and the longer the day, the more importance softness and comfort assume.
- **Security:** Nothing is more fundamental than ensuring that each child feels secure in a bedroom. Children feel secure in places where they can safely relax.
- **Safety:** Safety issues are complex and not simply a matter of presence or absence of certain equipment. A common response to an accident is to remove the offending equipment. However, safety involves the use and the context of the equipment, the expectations of parents and children. Equipment and materials should be continuously monitored for safety, repair, and safe use. Safe use is the critical point that the use should be considered in the context. Equipment may work in one context and be unsafe in another. So the equipment should be flexible in usage.
- **Privacy:** It should be recognized that there are degrees of privacy in a space. Physical boundaries may or may not provide visual or acoustic separation. As Parke stated, home environments are organized by sets of social rules that aid in regulating the interactions among the occupants. Children as well as adults have to have certain areas or territories within the home (Parke, 1980). Children need places to watch from and to hold back in, places in which to hide and seek things, and places which enable them to pause and reflect.
- **Order:** Children's settings require an ordered space that follows a planned goal. A planned complexity is necessary for an environment rich enough to challenge, but not so complex to frustrate. For example, if independence is a primary goal, then the materials should be stored and designed for independent use. Order enables one to express one's values, logic, goals, and concerns related to living. Therefore, to make an environment more comprehensible and functional to children, order is required.
- **Autonomy:** Since autonomy is the power to govern oneself, children are struggling to gain control over their bodies, their emotions, and their impulses. Issues of autonomy are present in all aspects of children's environments. The environment should encourage or allow children to hold sway over their bodily needs (hunger, sleep, thirst, etc.), mobility (to move around, to be still), space (to adapt, define, personalize, or protect a space), social life (to choose one's own company), time (to set one's own pace, to stop and start), things (to be able to select, determine the use, and to put things away) and activities (to choose activities and conduct them free from intrusion). Moreover, autonomy does more than build children's self-esteem, and adds to life's quality; it helps setting work better. Children invent the spaces they need.
- **Mobility:** Children's settings can be characterized in terms of mobility in two ways: freedom to move within the setting from place to place or activity to activity, and the amount of mobility allowed or required by the routines and activities.

- **The Adult Dimension:** Adults also directly control the amount, type, and variety of inanimate stimulation that is available to child. The decor and color scheme of his room, the type of mobiles and pictures, the books and toys available, are typically under control of adults in infancy and pre-school period (Parke, 1980).
- **Ergonomics:** Ergonomics is necessary to value the importance and the needs of each stage of life according to the capacities and limitations of each movement (Greenman, 1988).

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