DESIGN CONSIDERATIONS IN CHILDREN BEDROOM FURNITURE OF
PRESCHOOL PERIOD WITH AN ANALYSIS OF TODAY'S TURKISH
CHILDREN FURNITURE MARKET

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ABSTRACT

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

Keywords: Bedroom Environment for Preschool Children, Bedroom Furniture for Preschool Children, Child Development, Design Criteria, Turkish Children Bedroom Furniture Market.

ÖZ

OKUL ÖNCESİ ÇOCUK YATAK ODASI ORTAMLARINDA TASARIM
ÖLÇÜTLERİ VE TÜRKİYE'DEKİ ÇOCUK MOBİLYASI SEKTÖRÜNÜN
BUGÜNKÜ ANALİZİ

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Bu tez çalışmasında, sağlıklı ve teşvik edici bir okul öncesi çocuk yatak odası ortamı için gerekli tasarım şartları incelenmiştir. Çok amaçlı bir ortam oluşturabilmek için, erken çocukluk dönemi gelişimi, ortamı oluşturan gerekli mobilya birimleri ve tasarım konseptleri özetlenmiştir. Okul öncesi çocuk yatak odası ortamlarına kılavuz olacak genel tasarım ölçütleri belirlenmiştir. Tüm bu bilgilerin ışığında, Türkiye'deki çocuk yatak odası mobilyası sektörü incelenmiştir.

Anahtar Kelimeler: Okul Öncesi Çocuk Yatak Odası Ortamları, Okul Öncesi Çocuk Yatak Odası Mobilyaları, Çocuk Gelişimi, Tasarım Ölçütleri, Türkiye'deki Çocuk Mobilyası Sektörü.

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CHAPTER I

INTRODUCTION

1.1.   INTRODUCTION

This research was carried out in order to determine the requirements for healthy bedroom furniture for preschool children, which arouse their motivation and affect 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 the characteristics of the children.

For, 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 the new born to 1:2 in the

adult; at the birth the ratio of vertical head height to total height is 1:4 whereas in adults is 1:7 ½. The horizontal dimension of the head in small children exceeds 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.

1.2.   AIM AND METHODOLOGY OF THE RESEARCH

The goal of this project is the delivery of a report on the design aspects of children 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 Turkish market for children bedroom furniture.

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. In order to analyze the Turkish market,

interviews with the Turkish firms selling and/ or producing children bedroom furniture were conducted.

1.3.   THE STRUCTURE OF THE THESIS

The structure of the thesis is composed of seven chapters. Five chapters of the thesis give the information about the research and inferences about related subjects. The other two chapters build up the introduction and the conclusion parts of the thesis.

In the first chapter, there is a brief introduction to the thesis with the explanation of the aim and structure.

In the second chapter, characteristics of children are examined in order to get familiar with the behavior and expectations of them. The motor, cognitive, and social development of children are studied. Perceptual and evaluative approach of children to built environment is presented.

In the third chapter, bedroom environment is studied to point out the importance of a specialized bedroom in the preschool period of a child's life. Since stimulation is very important in a child's life, bedroom environment is analyzed as the source of stimulation. To decide on the necessary furniture for this stimulating environment, the activities that are done in a child's bedroom are determined. Finally, in the last part of the chapter, all of the concepts related with the bedroom environment for children are presented.

In the fourth chapter, furniture requirements for a motivating and healthy bedroom environment are analyzed. Item by item, bedroom furniture are examined, and their qualifications are presented. Furthermore, standards, materials and finishes, safety factors, and the role of color related with the children furniture are discussed.

In the fifth chapter, general criteria for the design of a preschool bedroom environment are explained so that the requirements of a comfortable and appealing bedroom environment of preschool children are clarified.

In the sixth chapter, an interview method used in the research is presented as a part of the field study. Both quantitative and qualitative outcomes of the research questionnaire are presented and evaluated. Later, the characteristics of the Turkish market dealing with children furniture are defined with the help of those outcomes.

The last chapter is the conclusion part of the thesis. In addition, the further studies are examined.

CHAPTER II

CHILD DEVELOPMENT

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).

The 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 the two basic strategies used by young children to perceive and learn the environment. In case that the experience, perception, or information is accepted, it is assimilated. If it does not fit, the mind may change the previous knowledge to the new one 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 the balance occurs between these two functions, the 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).

2.1. CHARACTERISTICS OF PRESCHOOL PERIOD CHILDREN

While children grow up, their needs and expectations change according to 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.

The researchers studying development of children generally divide the 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

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are guided by mental structures or mental representations of how things work.

Table 2.1. 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 year	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.

2.2. 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 the speed into smooth, accurate movements. Children of this period are curious, energetic and eager and they love to climb, run, and jump. This vitality in movements enables the 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

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development. The major milestones of motor development from age two to

six are summarized in Table 2.2.

Table 2.2. 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.

2.3. CHILDREN'S WORLD: COGNITIVE DEVELOPMENT OF CHILDREN

Children perceive the world in a different way. According to Fogel and

Melson, for the 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 (The 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 they are 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).

2.4. 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 impact on the child's cognitive and social development. The amount, the type, and the 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 the 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 early development (Parke, 1980).

2.5. PERCEPTUAL AND EVALUATIVE APPROACH OF PRESCHOOL PERIOD TO BUILT ENVIRONMENT

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. The 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 (Tunçel, 1981). Broad imagination capability of the child uses every object, as a raw material to recreate his own world despite the environment has 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 depend on their unlimited imagination (Ziegler and Andrews, 1987). For example, a child may use an environment just like a play material as the designer 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.

CHAPTER III

BEDROOMS FOR PRE-OPERATIONAL PERIOD CHILDREN

3.1. 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 it is 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, the researchers interviewed children and their parents about their use of space within their house, which offered a description of 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-used by all, but under mother's control. Those children who shared all areas, and had no conclusive use of 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 everyday. 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.

3.2. 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 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 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.

3.3. 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, as sleeping, play and tidying-up.

3.3.1. SLEEPING

Sleep is vital to the 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" that the children have to sleep. What is not a 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 the life, the children are expected to sleep even 17 up to 20 hours per day. Sleep is not continuous but a series of long and short naps (Harris, 1985).

Sometimes children get up before the rest of the family. Even in a childproofed home, preschool children can get into trouble if they are left unsupervised. 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 the 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.

3.3.2. PLAYING

The research done on the children for many years shows that children are in need of playing as much as doing all the other important necessities as a part of growing up. Since it is very difficult to separate the process of playing and the function it performs in the 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 the modern times. The ancient times is also analyzed from the viewpoint of the philosophers and the educators.

1. Ancient times

- Philosophers
  - Plato and Aristotle believed that play was essential for the healthy development of the 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.

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- 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 mean by which children assimilate experiences.

- Erikson developed Freud's theories, seeing its importance for 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 the child first engages mainly in the practice play, later symbolic play and finally games with rules.

- Parten observed preschoolers as progressing from unoccupied behavior through the stages of solitary, parallel, associative and cooperative play.

Table 3.1 compares the theories of Parten and Piaget (Heseltine and Holborn, 1987).

Table 3.1. Stage theories of play: Piaget and Parten
(Fogel and Melson, 1988)

	Stage of play	Description
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 toe 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.

Selfridge (1999) points out the effects of play that promotes children development in five main domains. The first one is the 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 one is the 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 one is the communication development which refers to the negotiation and planning that takes place during play. Children learn how to communicate their ideas and intentions to one and another and how to verbally resolve disputes. Their emerging interests in language and literacy are reflected in their play. The forth one is the 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 in 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 to 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).

- 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.

3.3.3. TIDYING-UP

Egill (2002) defines the tidying-up as an informal learning activity. Since the invitation to child for playing is communicated primarily by the 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.

3.4. 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 the presence or absence of certain equipment. A common response to an accident is to remove the offending equipment. However, safety involves the use and 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 on 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 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 the 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 the 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 the 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).

3.5. CHILDREN BEDROOM AS A MULTIPURPOSE SPACE

According to Leggett and his colleagues, multipurpose space is an environment where the flexible use of space is necessary because of the variety of activities and the variety of group sizes. This condition demands constant rearrangement of furniture and different combinations of items. Thus, furniture can be the most important mean to achieve this flexibility. Equipment also plays a large part in the effectiveness of the space (Leggett et al., 1977).

Flexibility is a necessity in a multipurpose space so that the design of the environment can be adapted to changing needs in shape, size and total configuration (Leggett et al., 1977). This aim is achieved via the furniture system having the capacity of expansion and the mobility of components (Figure 3.1, Figure 3.2). To arrange the environment without interrupting the activity, the equipment and the furniture must be light enough to be easily moved. The items of furniture system should be made of interchangeable and compatible standard modules, so that they would allow new arrangements that include beds, dressers, work surfaces,

bookcases, and other components of the bedroom. The material and assembling details of furniture are expected to be durable to bear multiple assemblies and disassemblies.

Heseltine and Holborn focus on the products in a multipurpose space that can be used to serve double-duty, which can conserve space to enable children much more free area in their bedroom (Figure 3.3). In addition, they underline "minimizing quantity" as an important fact in the flexible plan concept since so much is on view in a given space (Heseltine and Holborn, 1987). Although it is desirable to have many kinds of things stimulating the children's imagination, it is equally desirable to limit the quantities of similar things. Functional requirements of the multipurpose space should be provided with minimum number of components.

Figure 3.1. Capacity of expansion of furniture
(Vibel Company Catalogue, 2001)

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Figure 3.2. Mobility of components
(Vibel Company Catalogue, 2001)

In addition to the "double-duty" characteristics, the products used in a multipurpose space should be convertible (Robertson, 1990). According to Hurley, convertible furniture approach means to adapt the size and height of furniture to different ages with high design solutions in models (Hurley, 1999) (Figure 3.4, Figure 3.5).

Figure 3.3. Double-duty furniture
Box can be used as toy storage, and when the lid is closed, it can be used as a work surface (Vibel Company Catalogue, 2001).

Figure 3.4. Adjustable furniture
(Vibel Company Catalogue, 2001)

According to Robertson (1990), adjustable furnishing offers flexibility to a bedroom. Pieces that can be raised or lowered are also practical. Various mechanisms for adjusting furniture can be built into the pieces. For example, a desktop might slide into a series of notches or slots at different heights so the work surface can be raised as the child grows. In a multipurpose space, the kind of activity that is done by the children should shape the type of the furniture that will be used. Weilbacher shows that equipment, which can be changed or altered, encourages co-operative behavior and a wider variety of equipment-oriented activities, and gives children the ability to modify activities to their individual levels (Weilbacher, 1979). However, the immovable equipment, once its use has been explored, encourages more non-equipment games and social play. This would suggest that a balance between static and movable equipment should be achieved.
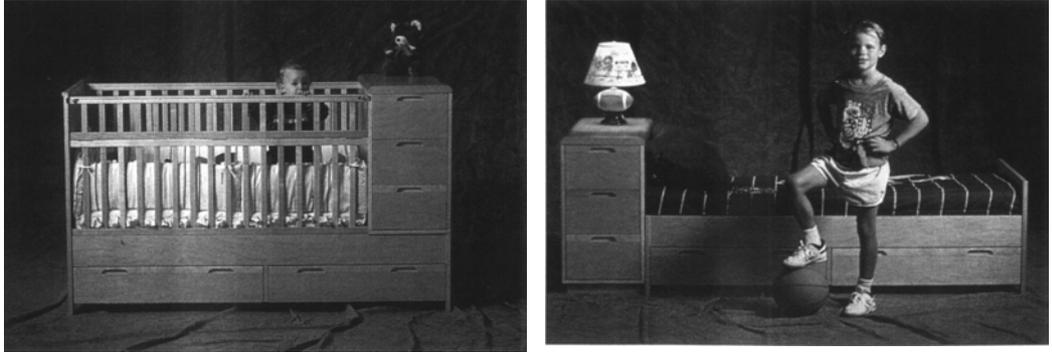
Figure 3.5. Convertible furniture
(Robertson,1990)

CHAPTER IV

**BEDROOM FURNITURE FOR PRESCHOOL PERIOD
CHILDREN**

According to Leggett and his colleagues, three criteria should be kept in mind while furnishing the spaces for children:

> *The space should be (1) a place that a child can dominate rather than be dominated by; (2) encourage movements of children, allowing the immediate formation of groups of any size to suit educational needs; and (3) provide comfort, beauty and stimulation* (Legget, et al.,1977).

Creating such an environment requires not only effective organization of furniture for children, but also proper selection of furniture for the bedroom environment. Therefore, the concern of this chapter is to analyze the furniture dimensions of the preschool bedroom environments.

In the first part of the chapter, the items of a bedroom environment will be explored and their properties will be pointed out in detail. In the second part, the domains that are in relation with the furniture will be discussed. These domains will be studied under the titles of standards,

materials and finishes, safety, color and the concepts for developing bedroom furniture for preschool period children.

4.1. ITEMS OF BEDROOM FURNITURE

Items of furniture constitute the places for the activities of the bedroom environment. These activities were divided into three parts as sleeping, playing and tidying up, in the previous chapter. In this part, the furniture related with these activities will be examined as the beds, work surfaces and sitting units, storage and display units respectively.

4.1.1. BEDS

Children spend a lot of time sleeping, so it is important to provide a safe, comfortable sleep surface that supports their growing bodies in a healthy way. Also it should be remembered that to a child a bed is more than just a place for slumber. It is a gymnasium, where infants develop motor skills and young children release pent-up energy. Later on, it is place for lounging, reading, and seating with friends.

Robertson (1990) divides the types of beds according to the age of the child, so that they are named as infant beds, intermediate beds and adult-size beds:

- **Infant beds:** Safety is the most important consideration in designing this type of bed. Infant beds are composed of cradles, bassinets

and cribs. Cradles and bassinets are for the first two or three months of life. The sides of the cradle should as high as possible to hold the baby securely when the bed is rocked. For safety, the rockers should curve only slightly, moving with a gentle motion. On a suspended cradle, there should be sturdy base, secure pivoting hardware, and a design that lets you lock the cradle in a non-swinging position. A stable base is also critical in a bassinet, which is a basket-like bed (often with a hood at one end) that may or may not have wheels. The basket and frame may be a single unit, or the basket may lift off the stand. For this alternative, the handles should be firmly attached to the frame. A wicker model should have no protruding reeds (Robertson, 1990).

Cribs come in two main sizes: the European (123cm×60cm), and the American (144cm×76cm). The latter lasts longer as the sides can be taken off and replaced with a bed guard. The sides of the cribs can be made out of wooden slats, Plexiglas or fabrics mesh to see the child in the crib clearly.

The ISO and European standards specify that, the corner posts of the crib should not be more than 15mm above the rest of the crib to prevent a child's clothing becoming hooked on to it. There should be no vertical bars missing and they should not be more than 6cm apart that is the width of about four fingers, so that a child's head cannot be stuck between them. Cutouts in the head of footboards should be avoided for the danger of any kind of entrapment. There should be two latches on a

drop sided crib, one at each end. The locking mechanism and the moving parts should be secured well and be out of reach of children. The mattress should fit closely into the crib (EN 1130-1/2:1996) (Figure 4.1).

Some cots have different height settings for the mattress base and the methods for lowering mattress vary. Cribs may have only two levels, while others have three or four. The lever of the crib can be easily moved or it may necessitate unbolting, repositioning the bottom support, and rebolting. These leveling options are useful for determining the right distance between the mattress and the top of the sides to discourage a child from climbing out.
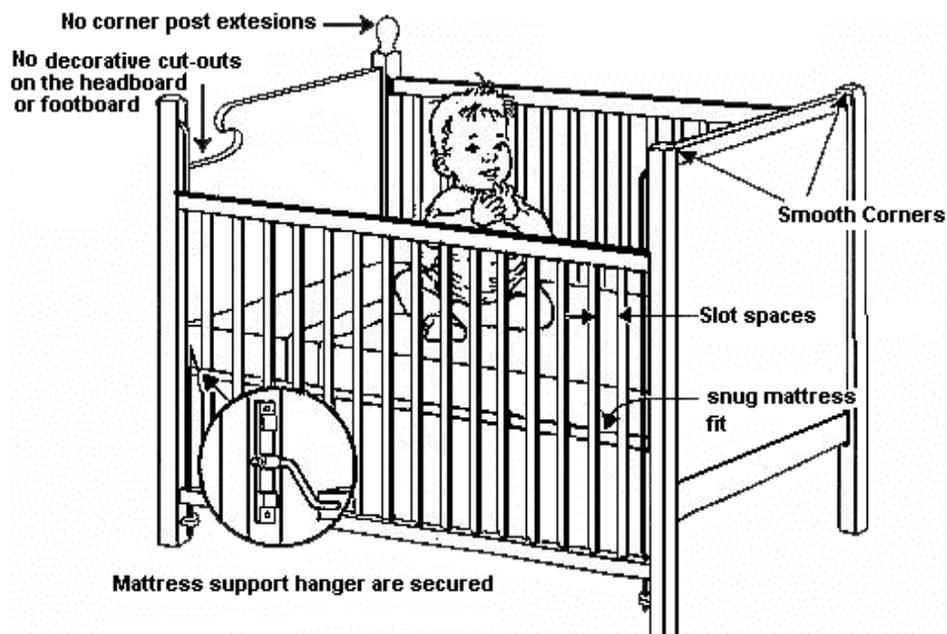
Figure 4.1. Safety requirements of a crib
(http://www.uwyo.edu/family/HEALTHYC/furniture.htm)

Once a child is able to climb out of the cot, the crib can be converted into a bed. On some models, one side can be removed to create a day bed, or both sides can be detached to make an intermediate bed. On the other models, the sides again can be removed and by adding a mattress extender, the sleeping area can be lengthened. The extender covers an area previously occupied by a chest of drawers, which is moved to the side.

Figure 4.2. An intermediate bed with a canopy
(Vibel Company Catalogue, 2001)

- **Intermediate beds:** These beds are also called as toddler or infant beds. These units are suitable for the ages of 2 to 5. In addition to beds that convert from cribs, many types are designed solely as intermediate beds, so they do not have any standard size unlike the cribs and adult beds. Some of the intermediate may be in the form of fantasy beds

(decorative beds), while others look like the miniatures of the adult bed, except that the mattress sits directly on slats and guardrails may be attached to the bed (Figure 4.2, Figure 4.3).
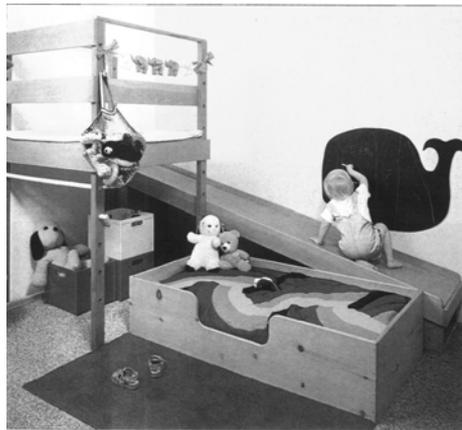
Figure 4.3. An Intermediate bed
(Gilberg, 1996)

• **Adult-size beds:** A standard adult bed consists of a frame, mattress, and box spring or other support. The frame may be just a plain metal support on casters or may include a headboard and/or footboard. Some beds are categorized by their frame design, for example, a four-poster bed. Standard beds come in twin, full, queen, and king sizes. The common types of adult-size beds used in children's bedrooms are categorized by Stepat-De Van (1980) as bunk beds, loft (platform) beds, truckle beds, chest beds, canopy beds and fantasy (decorative) beds (Stepat-De Van, 1980).

Figure 4.4. Bunk beds
(Gilberg, 1996)

Bunk beds provide extra play space and accommodation for an overnight guest (Figure 4.4). According to European Union safety standards for bunk beds, the bunk beds require a safety bar along the outer side. The standards rule that the gap between the mattress and the bar should not be more than 75 mm so that a child's body could not slip under the bar. Even for the bottom bunk, a bed guard could be needed to stop a young child who has just grown out of a crib from falling down (EN 747-1/2:1993).

If it is intended to use the bunks for a long time, the dimension should not be less then 90cm×180cm. There should also be minimum 75cm headroom between the bottom and the top bunk, enough clearance for an average adult to sit up in (EN 747-1/2:1993). The bunk beds that can be taken apart to make two single beds are more adaptable if the children are going to sleep in different bedroom in the future.

Bunk beds take many different forms. One type, also known as a *loft (platform) bed*, consists of a single raised bed with a desk and other

storage for clothes or toys underneath. In addition, a matching twin bed can be added under the loft to form an L-shaped bunk. Two beds either bunk or not can be designed in different forms according to the need of the children and requirements of the bedroom environment.

Figure 4.5. Loft bed with a desk area underneath
(Gilberg, 1996)

The other space-saving unit, *truckle bed* is designed to be stored underneath another bed to accommodate a sibling or an overnight guest. Truckle beds can either be freestanding units on castors or sit on attached frames. The important thing for the truckle beds is that it should draw out smoothly so that a child can handle it alone.

As the term implies, a *chest bed* is named for the built-in units. It contains at least two rows of drawers. Some models have shallow cabinets flanked by sets of double drawers. A chest bed may feature built-in drawers or a trundle, or both.

Figure 4.6. Truckle bed
(Gilberg, 1996)

Canopy beds have an overhead framework and often a roof-like covering to create a cozy atmosphere for the child by decreasing the height of the ceiling to child's scale. As different than the other kinds of adult beds, fantasy (decorative) beds come in such shapes as racing cars, airplanes, sail-boats, or teddy bears. Since elaborate models can be used for this kind of beds, the standards for the child use should be strictly taken into account (Robertson, 1990).

One of the most important parts of the bed is the mattress. The design of the bed should incorporate with material and thickness of the mattress. It can sit on either slats or a wood panel. Two main types for the mattresses, which are named as the innerspring mattress and foam (latex, polyurethane etc.) mattress, can have different thickness. ISO standard for the children beds states that the thickness of the mattress chosen shall be such that the internal height (the surface of the mattress to the upper edge

of the bed frame) is at least 500mm in the lowest position of the bed base and at least 200mm in the highest position of the bed base. There should be a recommendation on the bed concerning the size of the mattress when not sold with the bed. It should indicate the maximum permitted height or thickness of the mattress (ISO / EN 747-1/2:1993).
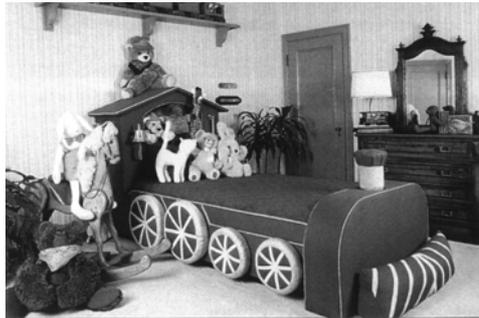
Figure 4.7. Fantasy bed in the form of a train
(Robertson,1990)

4.1.2. WORK SURFACES AND SITTING UNITS

Play is the leading source of development in the years between the ages of two and six that characterizes the preschool years (Frost, Wortham and Reifel, 2001). Therefore, children need some tools to acquire the skills, ideas, and values that are crucial for developing through play. Work surfaces and the sitting units constitute the main part of these tools that can be used in a bedroom environment.

Work surfaces are the basic pieces of furniture in a bedroom and comprise of tables, desks, and work benches. Work surfaces should have

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certain characteristics serving for the dynamism of a multipurpose space. According to Legget and his colleagues (1977), the work surfaces should be easily movable and modular. If they have wheels underneath, the wheels should be lockable. The surface of the tables, desks and workbenches are ought to be suitable for working with clay, paints and tools.

Different types and heights of tables are needed for different types of play. Since a children bedroom is a multipurpose space, as stated by Olds, dual-purpose surfaces such as counters, tables that stack or flip up or down, or platforms and risers that double as work, sitting and eating surfaces can be invented.

As the second tool, the sitting units that can be used in children bedroom environment, are composed of beanbag chairs, cushions, lounge chairs or sofas, stacking chairs, platforms, steps, benches, stools, puncture-proof inflatable chairs, a saw horse, a table top, a multi-use cube (Greenman, 1988).

Beanbag chairs make excellent resting and holding devices for children. Armchairs, couches, risers, pillows and cushions, low mattresses, and hammocks encourage cuddling and allow children really to settle in with books and toys. Rocking chairs, both adult and child scaled, encourage physical contact, calming rhythms, and constructive opportunities for movement.

Normally, the topic of play and sitting units conjures up images of tables and chairs that are at child's eye level. However, it may not be necessary to use the conventional chair-desk arrangements, as expected to be in every part of the child development. Furnishing should be creative to encourage the children to think and behave so (Legget, et al., 1977) (Figure 4.8).
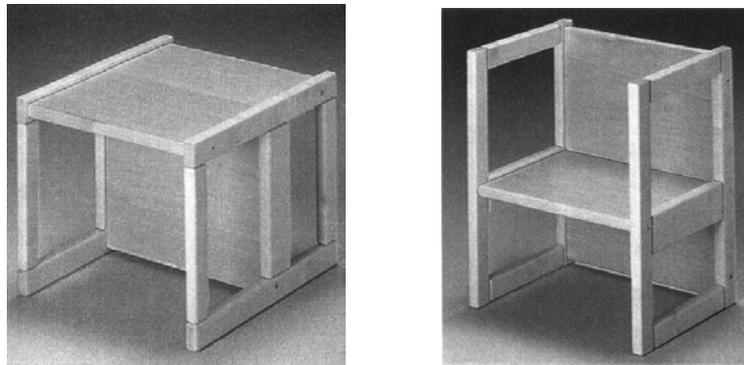
Figure 4.8. Chair and work surface unit together in a double duty furniture
(Baby & Children Rooms, n.d.)

Olds (1987) highlights the importance of conceiving the whole of the equipment in the room as potential play and sitting units and working surfaces. It is important to think in terms of the movements children must take in order to develop sensory-motor skills. For the children, these might include reaching vertically and laterally with hands and feet from a variety of positions; lying, sitting, and crawling on surfaces of different textures and degrees of responsivity, density, angles of inclination, and with varying

degrees of enclosure; using head, neck, and trunk muscles in the pursuit of sounds, objects, events; bringing objects to the mouth; gathering, filling, dumping, stacking, and knocking down loose parts. Therefore, sitting units and working surfaces are the most frequently moved and rearranged items of the bedroom environment. Since they are very mobile, they should be light, and easy to carry (Figure 4.9).

Figure 4.9. Work surfaces, sitting units, storage and display units form a multipurpose play area.
(Vibel Company Catalogue, 2001)

4.1.3. STORAGE AND DISPLAY UNITS

An adequate amount of space should be given to the storage and display units when designing a bedroom environment for children. A good storage or a display unit allows an environment to maximize the use of its resources while accumulating them. It teaches children about relations

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between things, and taking responsibility for things (Greenman, 1988). An organized storage extends and elaborates children's playing activities by making them more complex and longer lasting. In addition, a good storage and a display unit maintain harmony among the children and the adults (Figure 4.10).

Legget and his colleagues (1977) and Wilson (1953) divide the storage and display units into two groups. The first group comprises of static units for stationary and clothing, such as high storage walls, upper wall storage cabinets, stationary shelves and hangings, cabinets and clothing cubicles. The second group includes the low storage components, such as cabinets on wheels, cabinets with open and sloping shelves, and carts, especially for toys and playthings, that can be movable according to the purposes.

Figure 4.10. Open storage for both adult and child usage
(Robertson, 1990)

On the other hand, Greenman (1988) categorizes storage and display units along two dimensions, which can be named as the closed units and the open units. Every bedroom requires a balance of storage in all two dimensions.

Closed units can also be titled as adult storage, because children are rarely allowed to control a closed storage of any kind, even of their own possessions. They can be in the form of wall cabinets, shelving, and hooks. Wall cabinets are useful because they allow the space underneath to be used for storage or play. Shelving provides more flexibility than cabinets, and the height can be used to restrict the child access. In addition, shelving is mainly used for the display purposes. Both the wall cabinets and the shelving units must be attached securely to the studs in the wall or the cinder block with good hinges and brackets.

Open units are visible and open to the potential users (Figure 4.11). It is necessary because, as Laughlin and Suina points out;

> *Since displaying materials side by side strongly suggests connections between them and the possibility of combining them in some way, combinations of materials can suggest activities* (Loughlin and Suina, 1982).

Figure 4.11. Open storage unit for toys and playthings with wheels
(Cerver, 1991)

Apparently, open storage and display units enable children to visualize relations between the objects and plan future actions (Spencer, 1989). Furthermore, Olds (1987) suggests that the visual presence of play materials is a communication tool for the invitation to the child to play. It makes materials immediately accessible and allows knowing what is available, where it is to be used, and where it belongs (Olds, 1987). Moreover, the storage units can be semi-open to allow the child to use the open parts, at the same time make a restriction with the closed parts (Figure 4.12).

The point is already been made that the layout of materials can teach. The storage can be designed to organize the materials around a property: color, shape, size, transparency, etc.; a function: communication, pull toys, tools; a relationship: pencil and paper, dolls and clothes; an action or effect: sound making, dissolving; or other concepts.
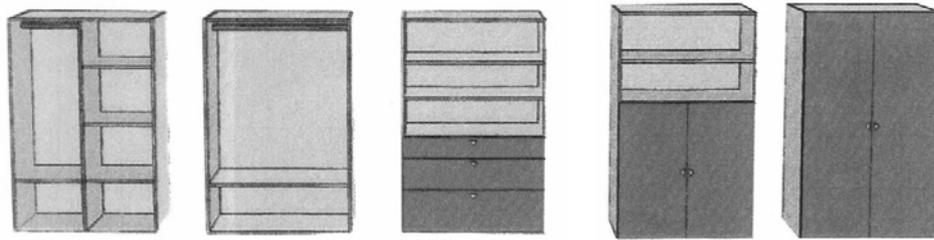
Figure 4.12. Open, semi closed and closed storage units
(Vibel Company Catalogue, 2001)

Furthermore, distinctiveness can be added to all of the features by limiting the number of items on a shelf, by defining compartment or clear boundaries with color, shape, or by juxtaposing contrasting items (Greenman, 1988). It is clear that there is relation between the development of the child and the organizational scheme. Since a child's bedroom is a multipurpose space, different alternatives of organization should be used to constitute a flexible bedroom environment. The storage units should be compatible with the other units of the bedroom. They should be convertible to the changing needs and serve the double-duty function (Figure 4.13, Figure 4.14).
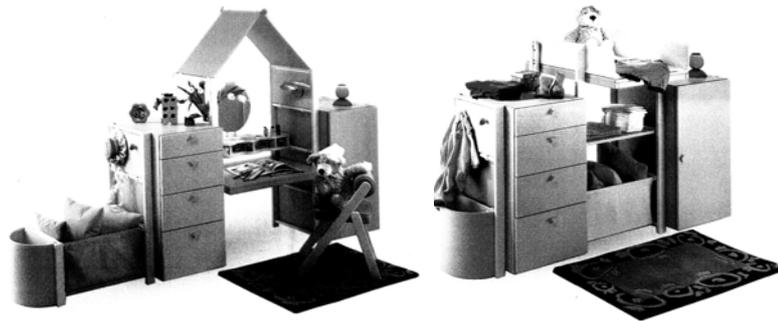
Figure 4.13. Convertible and adjustable storage, work surface and changing unit. The unit has a modular character that can be expanded.

(Vibel Company Catalogue, 2001)
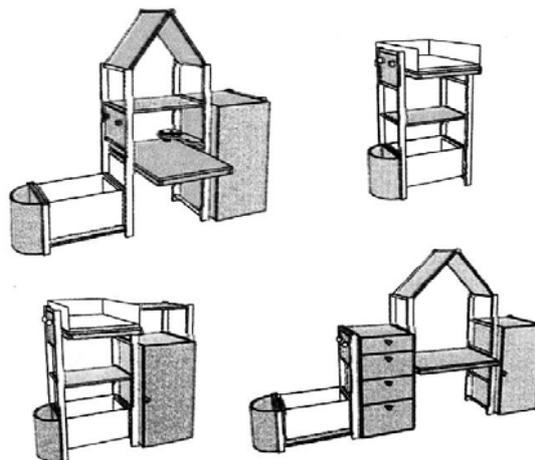
Figure 4.14. Alternative organizations for the modular unit
(Vibel Company Catalogue, 2001)

4.2. CONCEPTS FOR DEVELOPING BEDROOM FURNITURE FOR PREOPERATIONAL PERIOD CHILDREN

How much flexibility is required in the bedroom according to the need of the child determines the type of the furniture that will be used.

Robertson (1990) divides the furniture that can be used in the bedrooms into two; the first one is the ready-made and the second one is the custom-made furniture. Ready-made furniture can be analyzed in three parts as the stand-alone, modular, and furniture collection. On the other hand, custom-made furniture are often found in the built-in furniture concept.

1. Stand-alone: This type of furniture is movable. They can be rearranged, taken into another room. However, unless the piece is custom-made, it comes in standard dimensions.

2. Modular: Modular furniture offers great flexibility, allowing one to combine components, such as, a bed, headboard, shelves, drawers, cabinets, and work surfaces to fit the child's exact needs. Many of the units stack or abut to form larger composites. Components can be added and reconfiguration of the whole arrangement may be needed in the future. The components can be packed up when they are moved and rearranged in a new room. Some modular systems require assembly.

3. Furniture collections: Many manufacturers offer collections of furniture, composed of pieces that coordinate in style and finish. A collection designed for a child's room may include several different choices among stylistically coordinated beds, headboards, bedside tables, dressers, bookcases, desks, chairs, and framed mirrors.

4. Built-in: Built-in furniture is type of furniture that fits an area precisely. They are designed according to the requirements of the specific space. This kind of furniture can be built into nooks or under windows,

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creating a seamless look and utilizing space that might otherwise be wasted.

4.3. STANDARDS

Many countries have developed planning standards for the provision of children's furniture, including Canada, USA, European Union countries and the UK. The standards and the methods of determining the furniture vary considerably.

As it is stated in the ISO Standards, standards can play a key role in injury prevention and control because they have the unique potential;

- *to draw on technical expertise for design and manufacture,*
- *to implement solutions through legislation, and*
- *to educate through provisions for instructions, warnings, illustrations, symbols, etc.* (ISO / IEC Guide 50: 2002).

If standards are to fulfill their role in child injury prevention and control, standards-writers must consider how children might interact with the products their standards are addressing, regardless of whether or not those products are aimed specifically at children.

On the other hand, as Holborn and Heseltine (1987) stated, 35% percent of the accidents are due to the lack of the application of the standards. It is clear that without standards and targets very little attention is given to the design of the furniture. The standards should be an integral

part of the design rather than they are overlaid on the existing framework of a completed design of furniture.

When the standards of TSE (Institute of Turkish Standards) are analyzed, it is clear that Turkish standards are the direct translations of the European Union standards. Some of the standards for the furniture of the children bedrooms are as follows:

EN 747-1/2:1993 European Standards for bunk beds for domestic use

EN 716-1/2: 1995 European Standards for children's cots and folding cots for domestic use-

EN 1130-1/2:1996 European Standards for cribs and cradles for domestic use

EN 1129-1/2:2001 European Standards for furniture - Foldaway beds

EN 1334: 2001 European Standards for domestic furniture - Beds and mattresses

TS EN 6383:1989 Turkish Standard for furniture -Study table

TS EN 6881:1989 Turkish Standard for furniture - Chair and table for school

TS EN 3585: 1981 Turkish Standard for furniture - Chairs and tables for educational institutions

TS EN 1272: 1998 Turkish Standard for furniture - Child care articles - Table mounted chairs

4.4. BODY SIZE AND ANTHROPOMETRIC DATA

ISO standards constitute children's size in relation to their surroundings makes it necessary to examine their anthropometry,

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including overall heights as well as body part lengths, widths and circumferences. Anthropometric data should be used in order to establish the normal distribution and safety margins (ISO / IEC Guide 50:2002). According to Norris and Wilson (1997), taking data and guidelines into account when designing will give some basic parameters with which the product must fit in order to be usable. They ensure that the product is reasonably safe for its intended use and its intended users. Moreover, they extend safety as to include foreseeable misuse, which includes use by unintended users such as children.

On the other hand, certain characteristics of children's body size and weight distribution make them vulnerable to injury. Their overall mass is smaller, thereby reducing their capacity to absorb injury-causing energy. The following are examples where body size and weight distribution, as compared to adults, are factors in injury. The examples of entrapment and entanglements because of the inappropriate sizes of the gaps are given in the figure 4.15.

a) In the case of thermal injuries, a relatively small area of contact can affect a large proportion of their body surface. The large surface area in relation to the small body mass can result in a greater proportion of body fluids being lost from the burnt area.
b) Young children have a large head compared with their body size. Their center of gravity increases the likelihood of falls, for example from seated, climbing or standing. Children often fall directly on to the head without breaking their fall with their arms.

c) The relatively large size of the head means it requires a much larger space to pass through than the rest of the body. Entrapment occurs when the body passes, feet first, through a gap through which the head cannot pass.

d) Children might be able to insert their fingers, hands or other parts of their body into small openings to access rotating parts, electrical wiring, or other hazards (ISO / IEC Guide 50: 2002).

Body part	Completely bound openings		Partially bound openings	V shapes	Protusions	Moving parts of equipment
	Rigid	Non-rigid				
Whole body		■				■
Head neck, head first	■	■	■	■		■
Head neck, feet first	■					
Arm and hand	■	■				■
Leg and foot	■		■			
Finger	■	■	■	■		■
Clothing		■	■	■	■	

Figure 4.15. Examples of entrapment and entanglement in gaps
(ISO / IEC Guide 50:2002)

4.5. MATERIALS AND FINISHES

Materials can be divided into five parts according to the place where it is planned to be used. They can be arranged in order as constructional materials (bamboo, basketwork, chipboard and plywood, metals and alloys, plastics, rubber and wood), sheet materials (fur, leather, paper and board, plastics, rubber, textiles), coatings (enamel, metal plating, paint and varnish, plastics, rubber), fillings and padding materials (feathers, foamed plastics, hair, straw, natural wadding, man-made wadding) and the other supplementary materials (bristles, cord, string and rope) (ISO / IEC Guide 50: 2002).

Wood is the most favored material for furniture construction. As a general principle, slower growing timber is better than fast growing, and for the timber ranges, those whose logs are closed and have evenly spaced annual growth rings. Wide growth rings indicate fast growing timber, which is less durable. Woods can be either hardwood (from deciduous trees) or softwood (from conifers). The two groups differ in cell structure, appearance, and general properties. Common hardwoods used for furniture include oak, ash, beech, birch, maple, cherry, and walnut. Hardwoods make precise joints, hold fasteners better, are more resilient to wear than softwoods. Common softwoods are pine, fir, cedar, hemlock, linden used primarily in unfinished furniture. Several layers of wood are arranged with lengthwise grain in alternate directions to form plywood. All layers are glued together with synthetic resin that provides a very secure

bond. Addition to plywood, chipboard is the most frequently used material for the children bedroom furniture, which is made by combining wood flakes, wood scraps, and chips that are heat pressed into sheets. Chipboard is manufactured in three types of densities; LDF (low-density fibers), MDF (medium density fiber) and HDF (high-density fiber). Since LDF is a weak material that can be chipped out easily, they are used in the backside of the storage units, in the base of the drawers, etc. The cut edges of the LDF must be lipped, or hidden in some other way. By contrast, MDF is a stronger and uniform material. It can be cut into fancy shapes that are smooth all over, even at cut ends. There is no need of lipping to MDF and HDF as they are very hard materials like massive wood (Stepat-De Van, 1980; Kayasü, 1998).

Wood products can be finished in three ways. First finishing method is painting and varnishing. Special attention should be paid to the quality of the paints and varnishes that are used for children's bedroom furniture. Second one is the veneer, as a thin slice of wood, it should not be used in moisture environments. Third one is the plastic laminate which is combined of thin layers of paper coated with melamine, impregnated in synthetic binder and binded together. Particular attention should be given to the preservatives used, their type, toxicity, and flammability. They should conform the standards of the European Union or an equivalent country (Heseltine and Holborn, 1987; Kayasü, 1998).

The other material besides the wood is metal. Metal structures are avoided for safety reasons in children bedroom environment. The use of metal is restricted to some minimum structural elements or details of finishes in low risk zones, such as the legs of the bed and hinges of the storage units' doors. Metal parts need to be checked for sturdiness. The surface areas should be polished smooth and be free of any sharp burrs or bits of metal (Kayasü, 1998).

Plastics are one of the synthetic materials used in the children bedroom furniture. They are sturdy, durable, light in weight, interesting in texture and can be in many colors. On the other hand, they are very flammable and not very good for hygiene since in time dirt gets into their body (Robertson, 1990). Many types of forms and textures can be given to plastics with different manufacturing techniques used specially for plastic production.

As the last one, textiles are used in the manufacture of children bedroom furniture. The basic requirements for the various fabrics that are selected differ, because each one will be used under a different set of conditions. Therefore, it is important to know how a fabric will be used in order to select one that has the most appropriate properties. The textiles can be distinguished among four areas: fibers (like cotton, silk and wood), construction methods (like weaving and knitting), the application of colors and patterns (like dyeing and printing) and finishes (waterproofing, shrink resistant and flame retardant). Since the users are the children, they

should be durable to washing and fading. Shrinkage percentage should be in minimum level (Stepat-De Van, 1980).

Furthermore, for all of the material quality, ISO Standards states that all material used for children's furniture shall be visually clean and free from infestation. The materials shall be assessed visually by the unaided eye rather than under magnification (ISO 8124-1:2000).

4.6. SAFETY

CEN report defines safety as a balance between being safe from causing or suffering hurt, injury or loss and the other demands a product, process or service must meet. To reduce harm, attention has to be paid to:

- the child's stage of development (ability, weight, age etc.);
- the hazard presented by the product in the environmental circumstances under which it and the child come into contact with one and another;
- normal or reasonably foreseeable use, bearing in mind the normal behavior of children who do not generally share the same degree of care as an average adult user (CEN Report. CR 13387: 1999).

Child safety should be a major concern for society because childhood and adolescent injuries are a major cause of death and disability in many countries. Children are born into an adult world, without experience or appreciation of risk but with a natural desire to explore. Consequently, the potential for injury is particularly great during childhood.

Since supervision to the degree that always prevents or controls potentially harmful interactions is neither possible nor practical; additional injury prevention strategies are necessary (ISO / IEC Guide 50: 2002).

Intervention strategies aimed at protecting children must recognize that children are not little adults. Children's susceptibility to injury and the nature of their injuries differ from adults. Such intervention strategies must also recognize the fundamental concept that children do not misuse products or surroundings. Rather, children interact with them in ways that reflect normal child behavior, which will vary according to the child's age and level of development. Therefore, intervention strategies intended to protect children might differ from those intended to protect adults (ISO / IEC Guide 50: 2002).

The challenge is develop products, structures, installations and services (collectively referred to as products) in a way in which the potential for injury to children may be minimized. Preventing injuries is everyone's responsibility. Prevention of injuries can be addressed through design and technology, legislation and education (CEN REPORT. CR 13387: 1999).

The importance of selecting the correct equipment for the children is amply reflected in the studies of accidents, which have been undertaken around the world. Heseltine and Holborn (1987) conducted a research about the accidents related with the children equipment and they categorized the results under four main headings of accident causes:

- Maintenance problems: This is normally the area, which attracts the most attention although less than 5% of accidents are due to the equipment failure or maintenance problems. Especially the adult users besides the children should make controls over the furniture periodically.

- Equipment design problems: Approximately 35% of accidents are due to the design faults in the equipment. This is primarily the responsibility of the manufacturer; they do not pay attention to the European Standards, or equivalent foreign standards, they is a lack of understanding of how and why the children are using the furniture.

- Layout problems: Layout problems appear to account for around 35% of accidents. The reasons for this include simple positioning errors, providing equipment which is unsuitable for the bedroom or the age of the users.

- Child behavior: As it is reported in the article, children using the equipment in a way not envisaged by the manufacturer cause 20% of the accidents. If the essence of being a child is discovery, and children, when playing exploring the potential of an item of equipment, misuse is not possible. The more ways in which an item of equipment can be used, the greater the play value. Accidents caused by 'incorrect use' of equipment are generally a result of the manufacturer thinking only of the equipment's primary function and not of its secondary functions (Heseltine and Holborn, 1987).

4.7. COLOR

Child's immediate emotional response to external stimuli is faster than many of the adults. A conscious usage of colors in bedroom furniture stimulates the physical and emotional senses of the children. A contented and happy child can be made over excited and over active in a room that has warm hues of color, such as, red, yellow, and orange; the excited child can be calmed in an environment with cool hues of color, such as, blue and green (Stepat-De Van, 1980).

Color schemes can be used to reinforce the active or passive use of the spaces; since warm tones are conducive to high activity, whereas cool tones are quieting and soothing. In addition, using contrasting colors help the eyes to develop, to differentiate between objects and to access the dept notion. The selection of the color scheme can change as the child's age is changing. Children at the age of two to six years old at the preschool period choose stimulating colors like, reds, oranges, yellow, since they encourage them to activity (Olds, 1987) (Table 4.1).

Moreover, since children bedroom environment has a multipurpose character, it should be appealing, and practical. According to Heseltine and Holborn, the colors should be incorporated with the design of the furniture to stimulate or reinforce the feelings of children in the bedroom environment. Each part of the bedroom can be colored to encourage particular type of attitude and strengthen the design of such unit. In noiseless activity places where children are expected to sit and talk

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quietly, or sleep, the usage of curves and flowing lines is advised with the predominance of blues, browns, and natural colors. On the other hand, in activity parts with high physical mobility and noise, sharp irregular lines combined with bright, primary reds and yellows in decoration should predominate (Heseltine and Holborn, 1987).

Table 4.1. Color selection of children
(From Friedling, 1974)

Age Groups	Favorite Colors	Unfavorable Colors
5-8	Pink, red, purple, violet, lemon yellow	White, black, gray, dark brown
9-10	Red, pink, turquoise, reddish orange, brown	Grey, dark brown, black, natural green and natural blue
11-12	Green, light blue, red, violet	Olive green, natural green, purple, violet

CHAPTER V

DESIGN CRITERIA OF BEDROOM FURNITURE FOR CHILDREN

When the previous sections are analyzed, the general criteria for a bedroom environment and its furniture components can be classified into five main categories. These titles will be discussed under the following issues.

5.1. REQUIREMENTS FOR CHILD DEVELOPMENT

- When a children bedroom furniture is designed or evaluated according to the developmental characteristics of the children, all of the following factors must be considered that are summarized in Table 5.1.

Table 5.1. Table of user characteristics

USER CHARACTERISTICS	EXAMPLES
Personal characteristics	Age, gender, family, literacy
Personality	Motivation, risk taking, perseverance, attitude
Motor skills	Psychomotor skills (hand-eye co-ordination reaction times)
	Gross-motor skills (movement, balance, climbing stairs)
Psychological characteristics	Fatigue, endurance, energy expenditure Behavior
Behavior	Skilled performance at tasks specific to a product
Sensory characteristics	Vision, hearing taste, smell, touch

5.2. REQUIREMENTS FOR A MULTIPURPOSE BEDROOM ENVIRONMENT

• The main activity of a preschool child is play, so the bedroom should allow and reinforce the child to create different plays and activities with the design of its environment and its components. Besides the toys and playthings, work surfaces and sitting units comprise the components of play area.

• As the second activity, the children need to have a sleeping area, which contains beds as the main components for sleeping. Beds can be used as double-duty, and serve two or more facilities like both being a sleeping component and a storage.

• Tidying up is the third activity that should take place in a children bedroom environment. The adequate amount and type of open and closed, mobile and static storage and display units should be taken into consideration in the design facility.

• The bedroom should contain modular components that can be mobile, so that the children can change the organization of the component to build up new activities for themselves. These components should be light enough to be carried by the children.

• All of the components in the bedroom should be compatible with each other. So that, children should be able to expand the modules in the bedroom with other modules to enrich their activity.

• The components should serve more than one facility and should be used as double-duty to let the bedroom have much more free playing area for the children.

• Furniture components used in a multipurpose space can be convertible to the future needs and adjustable for the needs of the children.

• As expected to be in every part of bedroom, furnishing should be creative to encourage the children to think and behave so.

• In terms of the organization of the bedroom as a multipurpose space, the bedroom can be divided into sections according to the activities. So according to the mood of the activity that is done in that area, we can select the color and texture of the components and the environment accordingly.

5.3. HEALTH AND SAFETY REQUIREMENTS

• While these reorganizations are occurring, the components should be resilient to the accidents that can happen and should meet all the necessary standards and regulations.

• Figure 5.1 and figure 5.2 summarize the dimensional requirements for a bunk bed, and a baby crib. Safety requirements for all of the types of the children furniture is given in the table 5.1. These figures are summarized from the standards that were mentioned in the chapter 4.

- All of the surfaces should be easily cleaned, because the children in preschool period, who are learning to coordinate, may spill beverages or paints on the furniture. A child should never be made to feel guilty about such accidents, and if the room is carefully planned to allow for development, such accidents do no harm.

| SYMBOLS	DIMENSION IN mm
a	≥250
b	≥160
c	60≤c≤75
d^1	300≤c≤400
d^2	≥300
e	250±50
f	≥200
g	≤75
A	68°
h	300
H	600
All other gaps/spaces used =G	
12≤G≤25, 60≤G≤75, 200≤G	

PLAN

UPRIGHT AND SLOPING LADDERS

FRONT VIEW
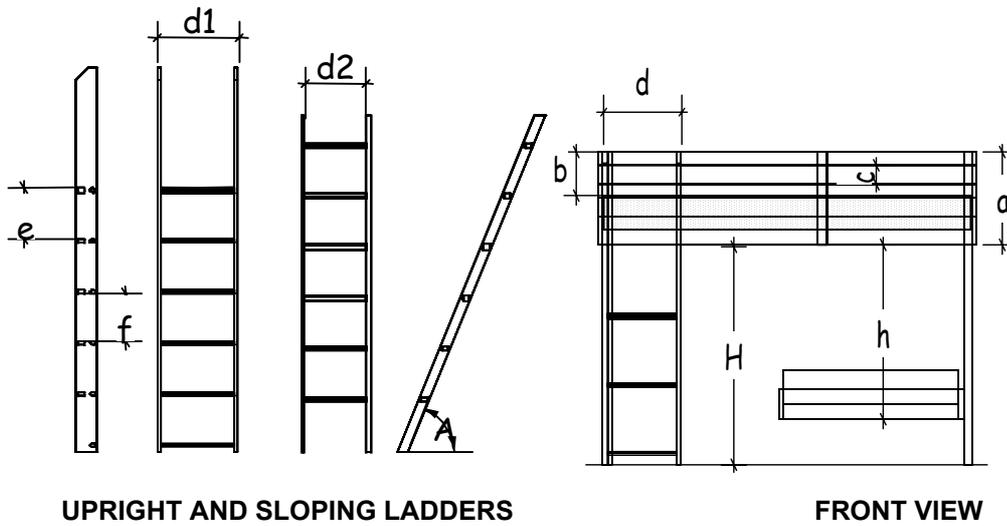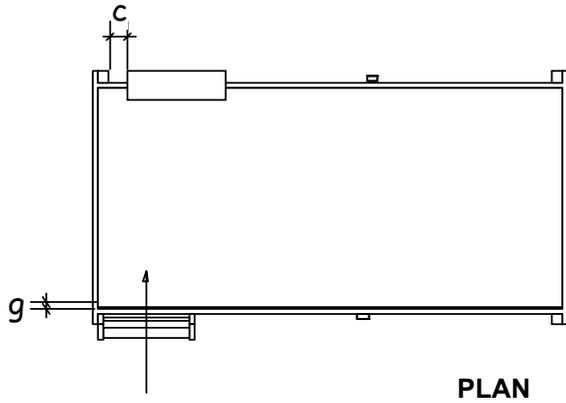
Figure 5.1. Standard dimensions of bunk beds
(EN 747-1/2:1993)

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SYMBOLS	DIMENSION IN mm
a	25
b	60(+5/-15)
c	0 to 7; 12 to25
d	7
e	60
f	85
h	300
H	600
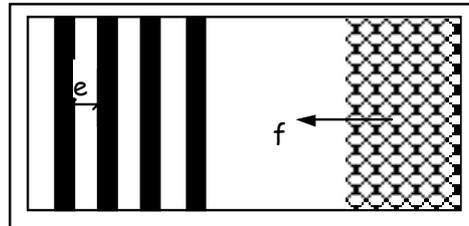
BED BASE PLAN
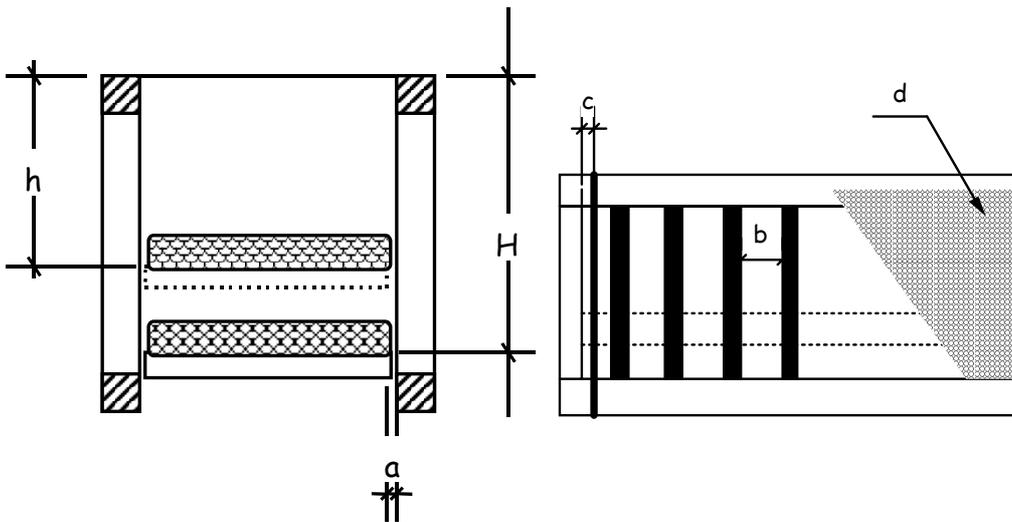
SIDE VIEW

CROSS SECTION

Figure 5.2. Standard dimensions of cribs
(EN 1130-1/2:1996

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SAFETY REQUIREMENTS	DEFINITIONS
MATERIALS	Wood, wood based material and material of vegetable origin Metal parts (hinges, brackets, catches) shall be free of burrs and edges and non-corrosive.
CONSTRUCTION	Exposed edges and protruding parts shall be chamfered and free of burrs or sharp edges.

$R \geqslant 2$

$R \geqslant 0,5$
$R \geqslant 2$
$R \geqslant 0,5$

$R \geqslant 0,5$
$R \geqslant 0,5$ $45°$ $\geqslant 2$

Connecting screws for direct fastening shall not be used for the assembly of any component that is designed to be removed or loosened when dismantling the crib/cradle for transportation.
Castors shall not be fitted except in the following arrangement, either two castors or two legs; or four castors, of which at least two can be locked.
If the bed base is adjustable, it shall not be possible to adjust it from a higher position to a lower position without the use of a tool.
In order to prevent a folding cot from folding unintentionally, the folding system shall be equipped with a locking mechanism.
The balancing systems shall not be powered by any electrical source or by any mechanism to swing or rock the crib/cradle and shall be fitted with a locking mechanism.

BED BASE	It shall not be possible for 25mm cone to pass through the aperture between the bed base and the sides, and between the bed base and the ends and the openings in the bed base.
STABILITY	Not more than one leg, castor/ wheel or corner of fixed cribs/cradles shall lift from the floor.

Table 5.2. Table of safety requirements for children furniture
(EN 1130-1/2:1996)

5.4. ERGONOMIC CONSIDERATIONS

- Child data must be considered as guidelines in the design of a children bedroom environment.

- The furniture should be designed in the guidance of children's anthropometric data and some certain body sizes and proportions.

- However, figure 5.3 gives values for boys only; designs based on these data will not exclude girls since the variance is slight. (The female body length from birth to age four averages about 1.3 cm less than male body length, and the weight averages about 0.7kg less. The variation encountered between the large and small percentiles of both males and females are available in the dimensional table (Diffrient, Tiley and Bardagjy, 1990).
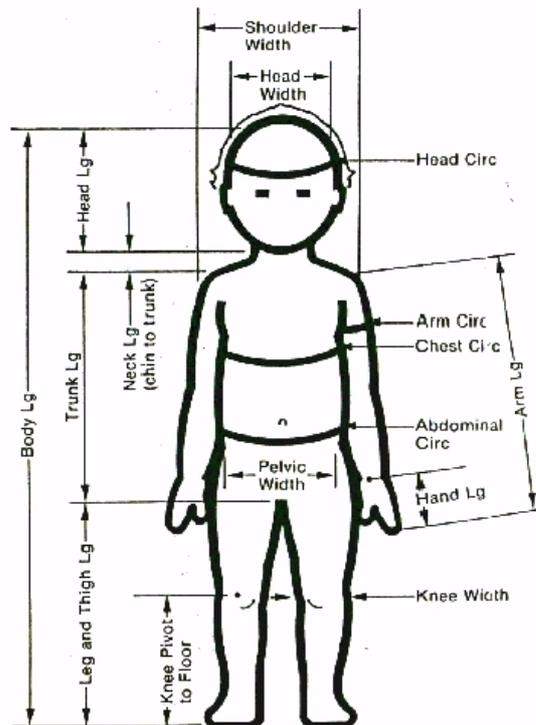
Age	2 years	2,5 years	3 years	4 years
Body Lg	86.4	91.2	95.3	103.9
Head Lg	19.1	19.3	19.6	19.8
Head width	14		14.2	14.5
Head circ	49.8	50	50.3	50.5
Neck Lg	2.5	2.5	3	3.3
Trunk Lg	34.5	36.1	36.3	38.1
Shoulder width	22.4	22.9	23.6	24.6
Chest Circ	50.8	51.6	52.1	52.8
Abdominal circ	46.2	46.7	47	51.6
Pelvic width	14.5	15.2	15.7	17.5
Arm Lg	37.1	39.4	41.7	42,4
Upper Arm Circ	16		16.3	16.8
Hand Lg	10.7		11.9	12.4
Leg and Thigh Lg	31.2	34.3	37.1	43.7
Knee Width	6.6		6.9	6.9
Knee Pivot to Floor	24.4		26.4	28.7
Sitting Hgt	53.8	55.6	57.2	59.7
Seat Hgt and Seat Depth	17.3	18.8	20.3	24.1
	kg	kg	kg	kg
Weight (approx)	12.6	13.6	14.6	17.2

Figure 5.3. Measurements of children 2 to 4 four years old
(Diffrient, Tilley and Bardagjy, 1990)

CHAPTER VI

PROBLEM STATEMENT AND FIELD STUDY

6.1. TURKISH MARKET AND DEFINING THE PROBLEM

According to the present author, who is designer specialized on children bedroom furniture, Turkish people were not aware of the role of a healthy bedroom environment in a child's life at the beginning. Later on, the market started to develop rapidly with the increase in the awareness level of the families and the entrance the foreign children furniture companies into Turkish field. Although the products are served with the best quality, the prices of these new coming products were very high to purchase for the Turkish users. Therefore, the Turkish furniture firms that were manufacturing home products started to work on this sector with a high amount of demand for children bedroom furniture. Therefore, to increase the sales rate, they decided to produce cheaper products for the market. Unfortunately, since the Turkish firms do not invest to gain any background information about the characteristics of the children, their requirements and the considerations related with the design of the children bedroom furniture and the bedroom environment which were stated in the

previous chapters, the end products are ought to be more appropriate in price for the Turkish user to purchase. The present author adds that with this kind of an approach, it was impossible to trade the Turkish children bedroom furniture products to the foreign countries and compete with the foreign companies in terms of the quality. Therefore, in the recent years, new firms are appeared in the market, which is only specialized on children bedroom furniture, and already existing firms constitute departments only dedicated to this type of furniture. These changes are done with the new generation designers that bring a new breath to the sector. These young designers are focusing on the requirements of the children and the necessary design considerations to form up a healthy environment for children. Although the awareness level is rising for the designers, in practice, the firms are still having diverse problems in the application of them.

The main question of this research is to find out the characteristics of today's Turkish firms working for the children bedroom furniture sector in terms of their company profiles, production and design processes. The sub questions are,

- To what extend the firms are employing designers.

- What are the concepts do the firms are using in the act of designing?

- Are Turkish firms aware of the standards and quality certificates of the furniture that they are producing?

6.2. PROGRAMMING THE FIELD STUDY

In order to collect data from the Turkish firms for children bedroom furniture, the survey research method is examined and out of this examination, the interview method is chosen. As the structure type of this method, nonscheduled-standardized interview is chosen to be used.

6.2.1. SURVEY METHOD

Monette, Sullivan and DeJong describe survey as a data collection technique. In this technique, the data is collected from the individuals, called respondents, by having them respond to questions. This survey data is composed of what people say to the experimenter in response to a question. Therefore, it is important to emphasize that since they only measure what people say about what they do, it may not give the right answer to what they actually do. Survey data can be collected in two ways: with questionnaires or with interviews (Monette, Sullivan and DeJong, 1998).

A questionnaire is based on a set of printed questions or presented interactively from a computer application or from a web site in order to collect data. Questionnaires can be done without the presence of an investigator conducting the interview, asking questions and reporting responses from the participant (Nielsen, 1993). On the other hand, an interview involves an interviewer reading questions to respondents and recording their answers. Interviews offer the investigator a degree of

flexibility that is not available with questionnaires (Monette, Sullivan and DeJong, 1998).

Questionnaires and interviews may contain open-ended or closed-ended questions. The proper use of these two types of questions is important for the quality of data generated as well as for the ease of coping with the data. In open-ended questions, the respondents are free to write down and explain their thoughts in detail about the subject. Different quotes and ideas can be collected from open-ended questions. It is a useful method when researchers cannot predict all the possible answers to a question in advance or when too many possible answers exist to list them all practically. In closed-ended questions, participants choose the answer, which best suits their thoughts or simply rate that question. Thus, the answer should contain all of the possible responses. All of the questions should be simple and direct, expressing only one idea (Babbie, 1990, Monette, Sullivan and DeJong, 1998).

6.2.2. INTERVIEWS

In an interview, the investigator or an assistant reads the questions directly to the respondents and record their answers. During an interview, the investigator may have a chance to explain the questions and prevent any ambiguities. It is possible to rephrase the questions during an interview for the benefit of the participants (Jordan, 1998).

The degree of structure built into an interview affects the flexibility property. This structure is derived from the degree of freedom that the interviewer has in conducting the interview and respondents have in answering questions. Monette, Sullivan and DeJong (1998) put forward that interviews can be analyzed in three levels of structure; first one is the unstandardized interview, second one is the nonscheduled-standardized structure and the last one is the schedule-standardized structure. The unstandardized interview has the least structure. For this structure, the interviewer is asked to have a general topic area for the guidance throughout the interview. The interviewer explores the topic simultaneously and directs way of the interview by developing instant questions and probes. Nonscheduled-standardized interviews add more structure, with the topic narrower and specific-questions asked of all respondents. The interviewer is free to probe, rephrase questions to direct the interview; on the other hand, it includes specific open-ended type questions. The schedule-standardized interview, as the most structured type, contains specific instructions for the interviewer, specific questions in a fixed order, and transition phrases for the interviewer to use. Its structure is very rigid and does not allow the interviewer or the respondent to depart from the main topic of the research.

Conducting an interview is a very important and it should be taken into consideration seriously. There are some facts that build up a successful interview. Since the interview is a social relationship aimed to

exchange information between respondent and interviewer, it is important for an interviewer to collect complete and unbiased data by following the interview schedule. Moreover, controlling interviews correctly enhances the quality of the interview. The physical and the social characteristics of the interviewer also affect the respondent. Therefore, the necessary care needs to be taken before the interview. If an interview schedule is used, probes can be used to complete responses. The central task of interview is to record the responses of the respondents. Recording responses get easier as an interview schedule is used. For a nonscheduled interviewing, the responses can be longer and hard to record. If the interviewer does not have any recording device, all that needs to be done is recording the key points that the respondent makes (Monette, Sullivan and DeJong, 1998).

6.3. THE RESEARCH INTERVIEW

In this study, survey method was chosen as the type of data collection method because it involves collecting data from a limited sample of people. Furthermore, all surveys involve presenting respondents with a series of questions to be answered. For the data collection, interview method is used to be in an interaction with the firms' representatives and their products at the same time.

The aims of the interview were to gather data about the Turkish furniture market for children bedrooms, to find out the company profiles

and to find out the layout of their design, manufacturing and marketing processes.

This study aimed to collect data about the Turkish children bedroom furniture firms. The population was chosen randomly from the firms specialized only on children furniture, and the firms working on all of the home furniture and having children furniture as a sub department. Furthermore, another important fact for selection was all of the firms should have at least one showroom to present their goods to the users besides the workshop area. The representatives of the population were from the different cities of Turkey. The distribution of the selected firms according to the cities where their headquarters were located, were shown in the Figure 6.1.
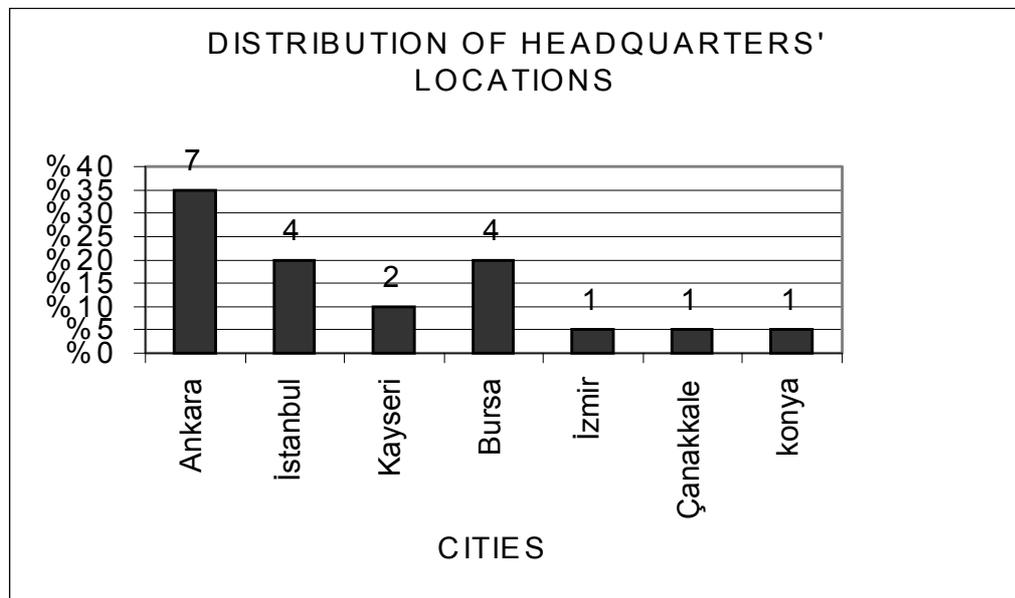
Figure 6.1. Distribution of headquarters' location of the firms

Non-proportional snowball sampling method was chosen as the sampling method (Monette, Sullivan and DeJong, 1998). Snowball sampling starting with few cases of the type that is proposed to be studied, leads the interviewer to more cases and in turn, the interviewer is expected to search still more cases. As the first stage, 25 firms were chosen to contact via telephone. The aim of this stage was reaching the respondents and setting up appointments for the research interviews. From the total amount of 25 firms, only 15 of them accepted to attend the interview. In the second stage, the firms attending to the Fair "Anne ve Çocuk, 2003" which was held in Lütfi Kırdar Exhibition Center in İstanbul, were visited during the fair exhibition. The main aim of this second stage was gaining more respondents to increase sample size. In the fair, there were seven exhibitor firms working for the children bedroom furniture sector and from this group, only five of them accepted to attend the research questionnaire. In the end, the final sum of the population for the field research became 20 firms.

The respondents of research questionnaire can be classified according to their sexes, statuses in the firms and professions. Firstly, 30% percent of the respondents were female and the 70% percent of them were male. Secondly, the statuses of the respondents were composed of the general directors, sales managers, designers and firm owners. Lastly, from the profession point of view, 40% of the respondents were composed

of designers from the professions of industrial designer, interior architect and performing arts and stage designer.

In order to avoid misinterpretations during the interview, the interview structure was prepared using brief and clear questions. The structure consisted of three stages and the body was 5-pages long including supportive tables (Appendix A). In the first stage, questions related with the company profile were asked. In the second stage, questions about the design process and in the third stage, questions related with the manufacturing and sales were asked. Also for any further information, the name and the status of the respondents were taken.

6.3.1. OUTCOMES OF THE RESEARCH QUESTIONS

STAGE 1: Company profile

Question 1: "How long has the firm been working in the children bedroom furniture market?"

The working period of the firms were necessary to make a generalization on the age of this market in Turkey. The working period of the firms are shown in figure 6.2. It can be seen that the children furniture market in Turkey is not a recently invented facility, but being very popular in the last ten years.

Question 2: "What kind(s) of services the firm is giving for this market?"

This question was essential to understand the service profiles of the firms whether they are designing, manufacturing and/or assembling. The results

show that in the market for children bedroom furniture, majority (55%) of the participant firms prefer a system of designing, manufacturing and assembling together by themselves (Figure 6.3).

Question 3: "What is the firm's approximate annual sell amount to the Turkish users in TL from children bedroom furniture sector?"

The approximate sales rate was asked in order to find out interest of the families to children bedroom furniture. Since this question can be considered as a company secret, the firms were free not to make any comment. Depending on this choice, 70% percent of the participants evaluates this question as a company secret and prefer not commenting (Figure 6.4).

Question 4: "How many employees does the firm accommodate?"

The number of the employees was asked to gather data about the scale of the firm and its departments. While 50% percent of the participant firms had 11-50 employees, very close to this result, 40% percent of them had 100 and over employees (Figure 6.5).

Question 5: "Annually, how many compositions do the firm sell to the Turkish users?"

This question was asked to make a general estimation on the selling. The term "composition" is a jargon in the furniture market to describe a group of alternative design solutions for furniture. Since 40% of the participants prefer not commenting on the subject, the other 40% percent is selling up

to 100 groups of alternative design solutions for children bedroom furniture per year. (Figure 6.6)

Question 6: "What is the origin of the product that the firm selling?"

Origins of the products are used in order to exclude the foreign products from the research. With the percentage of 95%, Turkish children bedroom firms prefer selling only Turkish products (Figure 6.7).

Question 7: "Do the firm sell supporting products with the main furniture? If the answer to the first question is 'yes', the next one will asked. What are those supporting products?"

The selling of supporting products was asked as "yes" or "no". If the answer were positive, five different supporting products were listed for the participants in order to choose the ones that were found in their showrooms. As a result, 70% of the participant firms choose selling supportive products with their main products. Moreover, in such supportive products, toys have no place; on the other hand, frequency of the other products shows a balanced distribution (Figure 6.8).

Question 8: "Which media is the firm using for advertising purposes?"

Five different media were listed for the participants in order to choose the ones that the firm is using. This question was asked to determine the most popular mean for the advertisement. In addition, if they have any, the web site addresses of the firms were recorded for a future reference. The interview resulted that the most common advertisement technique (90%) is

distributing brochures. In addition to brochures, with the percentage of 85%, firms have their own web site and e-mail address (Figure 6.9).

STAGE 2: Design Process

Question 9: "Does the firm employ a designer?"

This question is asked to analyze the awareness level of the firms whether they are giving the required importance to the design function. As a result, 85% of the firms are aware of the importance of design profession for the firm and employ at least one designer in their offices (Figure 6.10).

Question 10: "This question will be asked, if the answer to the question 9 is 'yes'. Which specific professions are the firm's designers from?"

3 different professions were listed for the participant. There was another forth line named as "others" to write down any other professions, if there were any other profession different from the list. It is seen that 53% of the participant firms prefer working with interior architects for the design process.

Question 11: "Do you have a separate 'research and development' department in the firm?"

The relation between having a research and development department and the application of standards and quality certificates was examined since research and development departments apply these standards and certificates to the products and to the organization of the company. Nearly half of the participant firms (45%) support the research and development activities and develop a specialized department for them (Figure 6.12).

Question 12: "What kind of considerations that the firm is following up?"

The answer was prepared in three parts and Appendix B was used. First part was about the production technique of the firm, the second part was about the furniture types and the last part was about the requirements of a multipurpose space. The results are shown in figures 6.13a, 6.13b, and 6.13c respectively. Firms for children bedroom furniture can be divided into two groups according to their type of production, as "boutique" type, which means custom-made production and "fabrication" type which is used instead of mass production. Since "boutique" type firms prefer designing furniture collection, the "fabrication" types choose modular furniture as the furniture type. Moreover, the firms prefer designing convertible and adjustable products for the children's bedrooms.

Question13: "How does the firm is deciding on what type of color is used for particular products / compositions?"

An open-ended question was asked to participants since none of the possible answers could be predicted. Participants were free to give any answer. There are two main answers for this open-ended question. First approach is deciding on the color scheme by the requirements of the chosen concept for that particular composition. For example, a furniture composition with an outdoor concept is expected to have the tones of green and brown. On the other hand, as the second approach, they use the colors according to the choice and taste of the customer. For this kind

of an approach, the furniture firm must have a wide range of colors in their archives.

Question 14: "Do the firm use the existing standards and the quality certificates for the children furniture in the products and in the organization of the firm?"

This question was asked to analyze the usage of the standards and the quality certificates of the Turkish children bedroom furniture firms. While 55% of the participant firms have declared that they observe standards and the quality certificates are existing in their body, 45% have declared that they do not use any of them (Figure 6.14).

Question 15. "If the answer is 'Yes' for the question14, this question will be asked. What are the standards and quality certificates that the firms use for design and organization process?"

Three different standards and quality certificates were listed for the participants in order to determine the usage percentage of the standards and certificates in Turkey. The result shows that the most common quality certificate (47%) used in the Turkish children bedroom furniture market is "TSE". TSE is a quality certificate given by the Turkish Standards Institute (Figure 6.15).

STAGE 3: Manufacturing Process

Question 16: "What types of materials is the firm using in the manufacturing process of the products?"

For the answer of this question, Appendix C was used. Appendix C divides types of the materials into five parts; "constructional materials", "sheet materials", "Coatings", "Fillings/Padding" and "Others". The usage percentile of constructional materials, sheet materials, coatings, fillings/padding and other materials are shown in figures 6.16a, 6.16b, 6.16c, 6.16d and 6.16e respectively.

Question 17: "Is the firm making the manufacture in its own plant?"

The existence of the manufacture department was asked to the participants. All of the firms have their manufacture department in their own body.

Question 18: "Who is giving the assembly service to the end-users' products?

Three different answers were listed in order to gather data about who is giving the assembly service to the end users. "Firm's own fitters", "franchisee's fitters" and "sub-contractor's fitters" were listed for the participant to choose. The results are very close to each other since 55% of the participants choose to accompany their own fitters and give the service and 45% of them choose not giving this service by themselves, but with the mediation of the franchisees (Figure 6.17).

Question 19: "Do the firm give after sales service?"

This question was asked to the participants to gain information about the services given after the sale. All of the firms are promising after sales service to the end-users in case of any unpleasant event.

Question 20: "Do you have a guarantee period? "

The existence of a guarantee period was necessary in order to crosscheck the application of the standards and quality certificates. All of the firms declare that their products are under guarantee.

Question 21: ". How many years after the sales is your guarantee period valid?"

The validation time was asked ranging from "1 year" to "5 years" in order to understand how much the firms support their products for their quality. Figure 6.18 shows the distribution for the validation period of guarantee. 1-year period is the most common one with 50%.

Question 22: "Does the firm give instruction leaflet to the end-users?"

Instruction leaflet informs the end-user about their products and constitutes a future reference. Although an instruction leaflet is a very useful mean for the both sides; the end-user and the producer, its distribution and usage is not much common in Turkey (5%) (Figure 6.19).

Question 23: "If the answer is 'Yes' for the question 22, this question will be asked. What kind of parts does the firm's instruction leaflet contain?"

As the general rules for the products, four parts were listed; "Guarantee", "Safety", "Cleaning" and "Element utilization" to be chosen by the participant firms. Every instructions leaflet includes utilization part, which contains the technical specifications and fitting directions of the products (Figure 6.20)
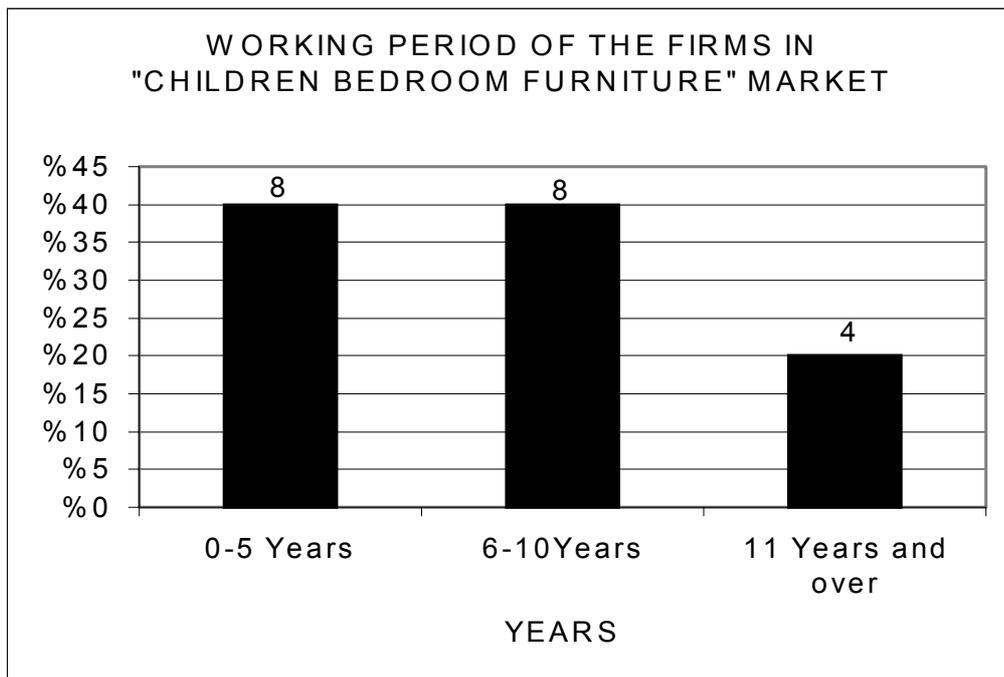
**Figure 6.2. Working period of the firms**
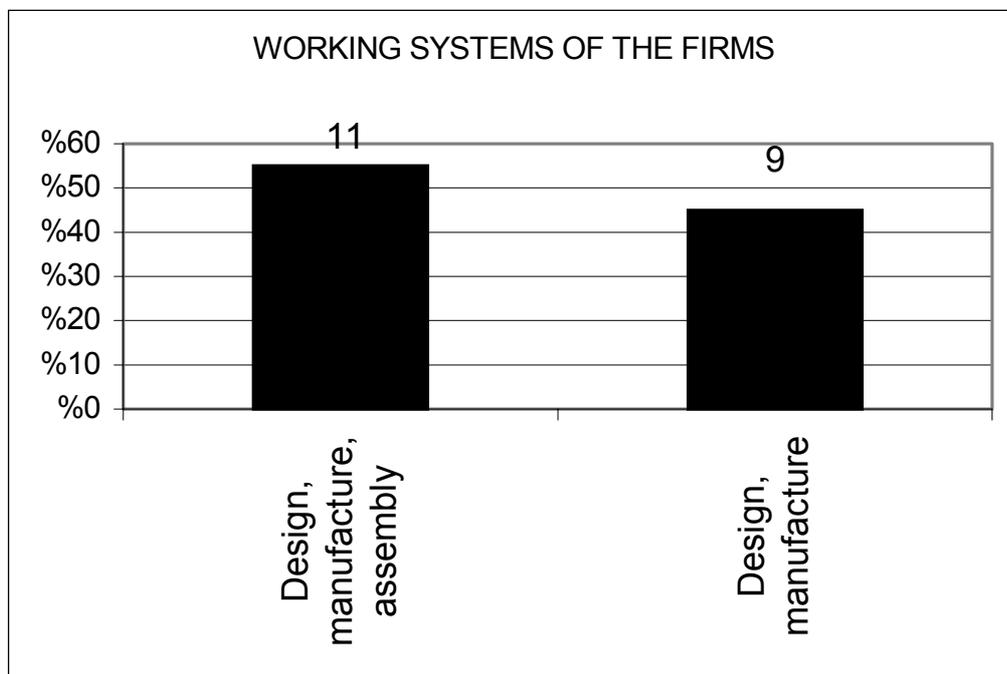
Figure 6.3. Working systems of the firms
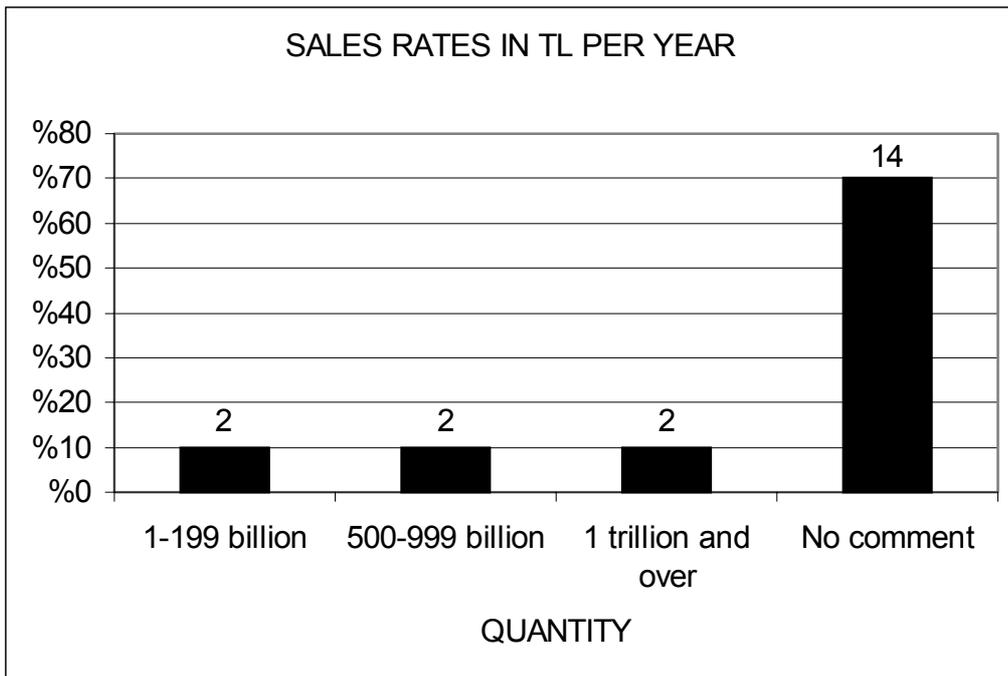
Figure 6.4. Annual sales of the firms in TL
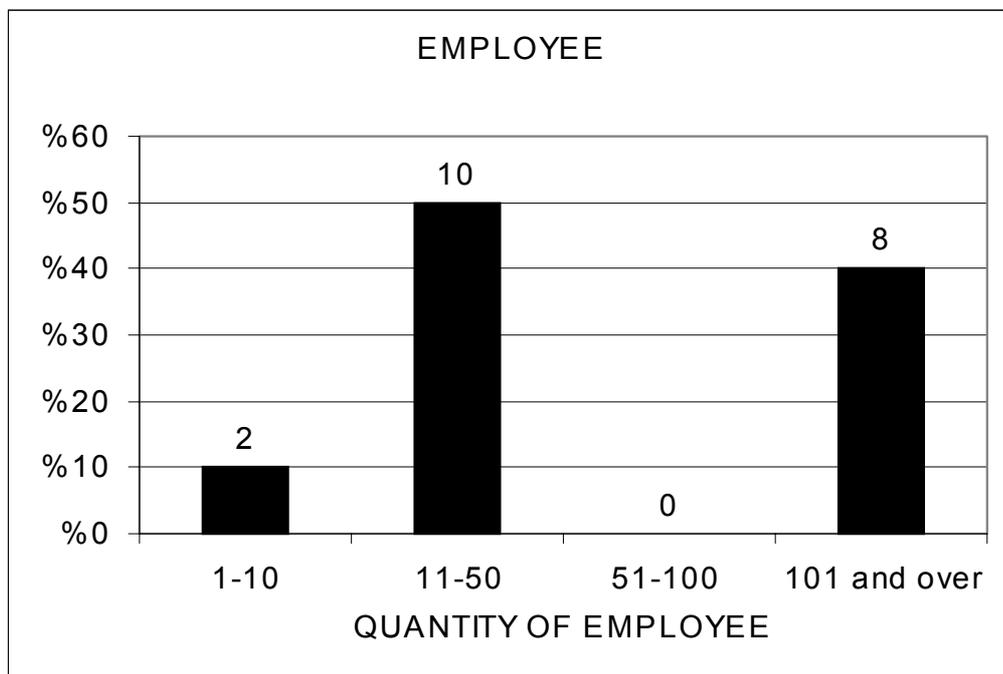

Figure 6.5. Quantity of the employee

AVERAGE COMPOSITON SALES OF FIRMS PER YEAR
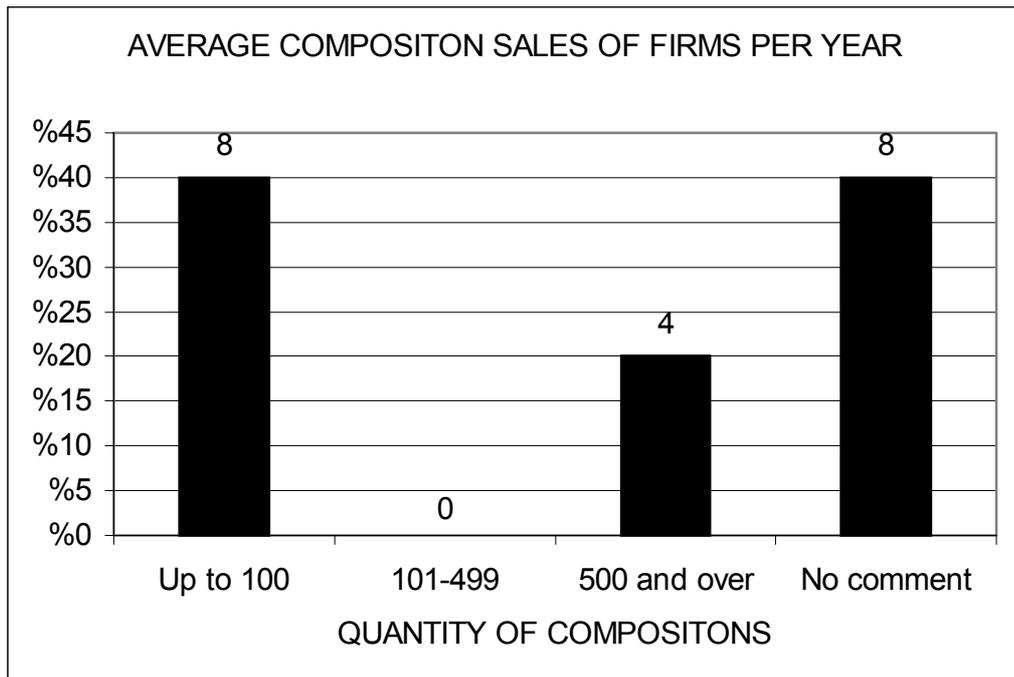
**Figure 6.6. Average composition sales of the firms per year**

ORIGIN OF THE PRODUCTS THAT THE FIRMS ARE SELLING
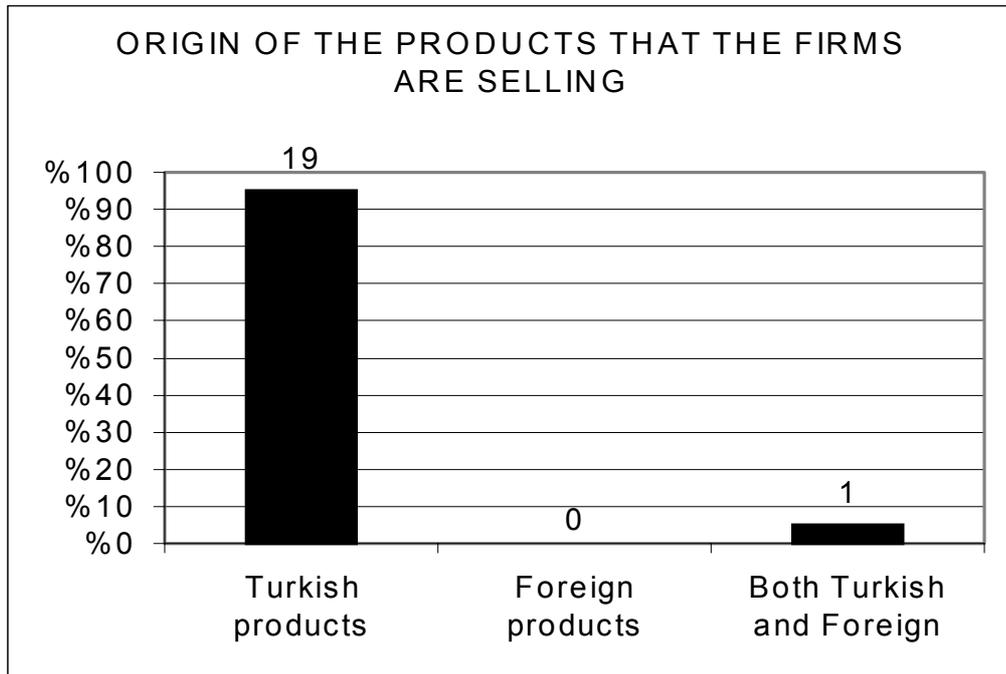
**Figure 6.7. Origin of the products that the firms are selling**
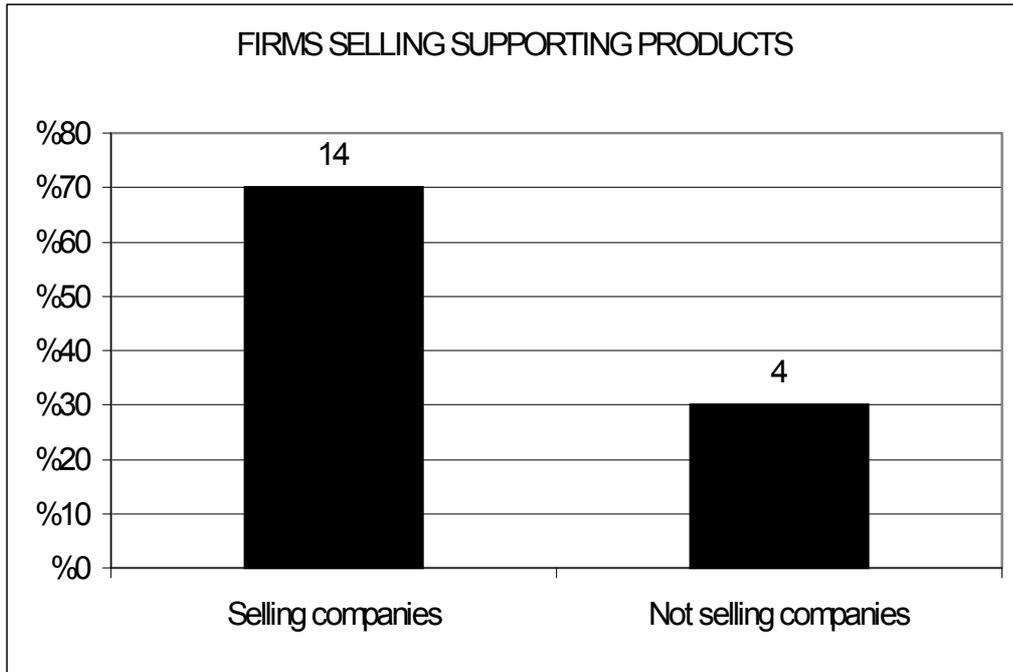
**Figure 6.8a. Percentage of the firms selling supporting products**
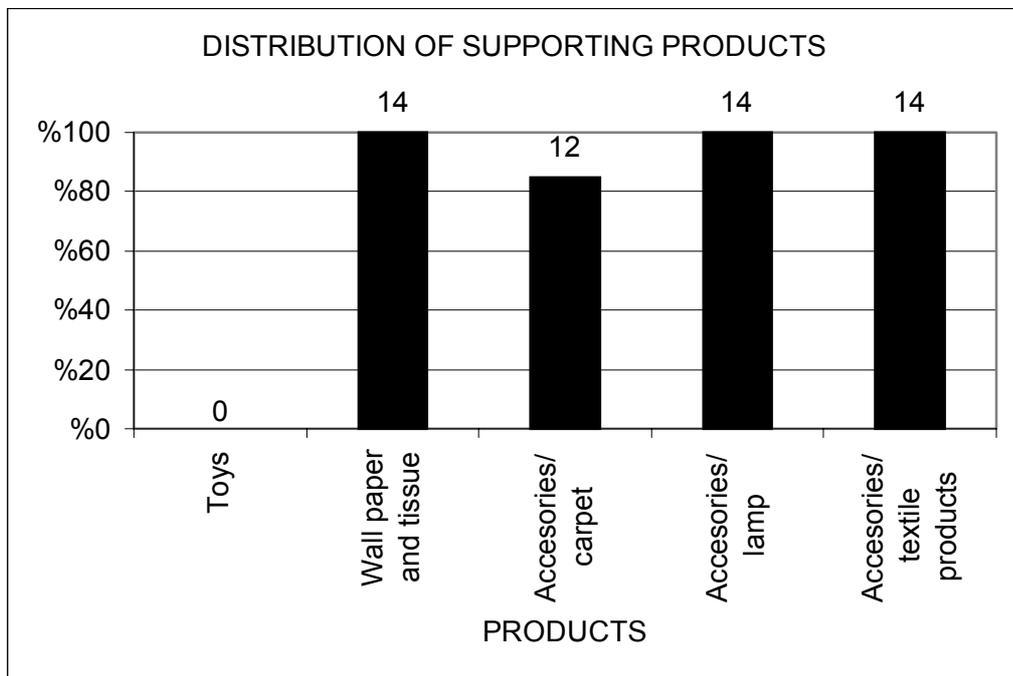
**Figure 6.8b. Distribution of the supporting products**
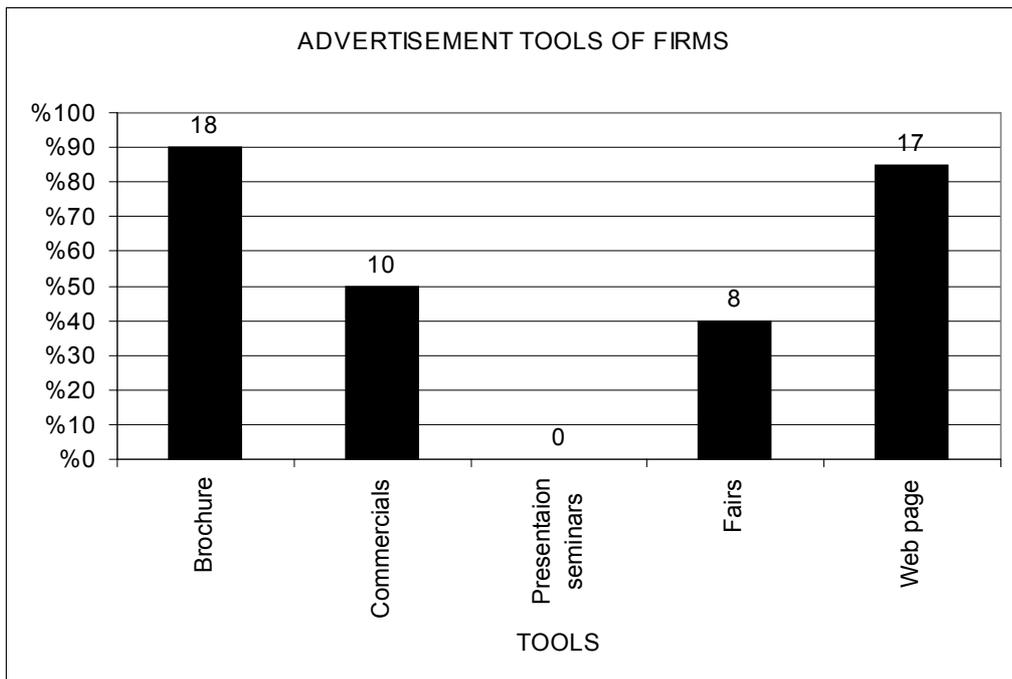
**Figure 6.9. Advertisement tools of the firms**
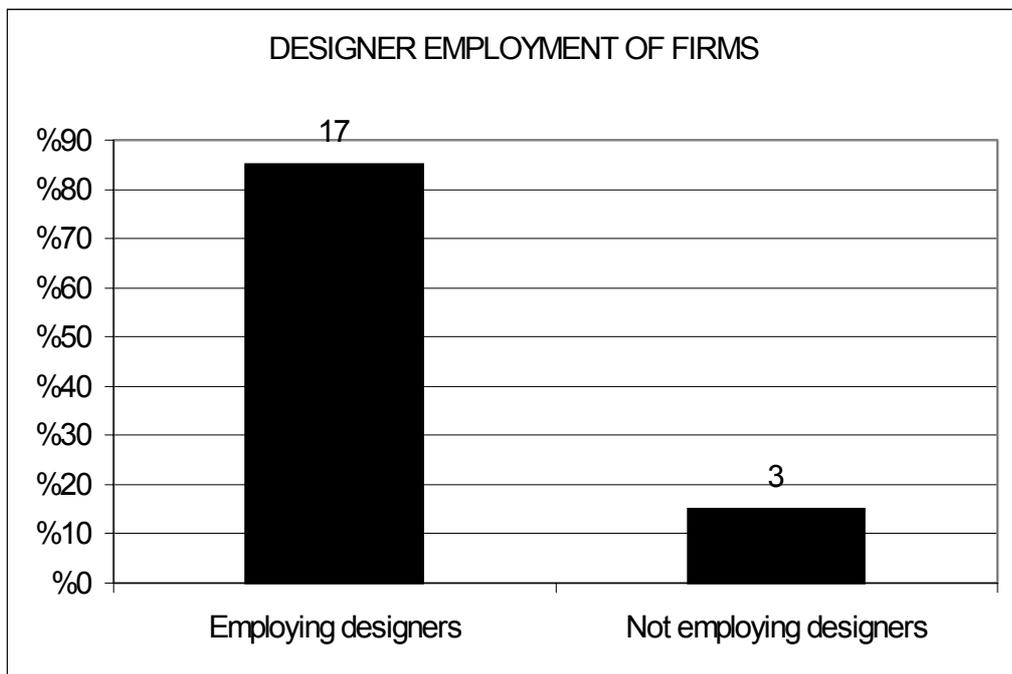

Figure 6.10. Designer employment of the firm
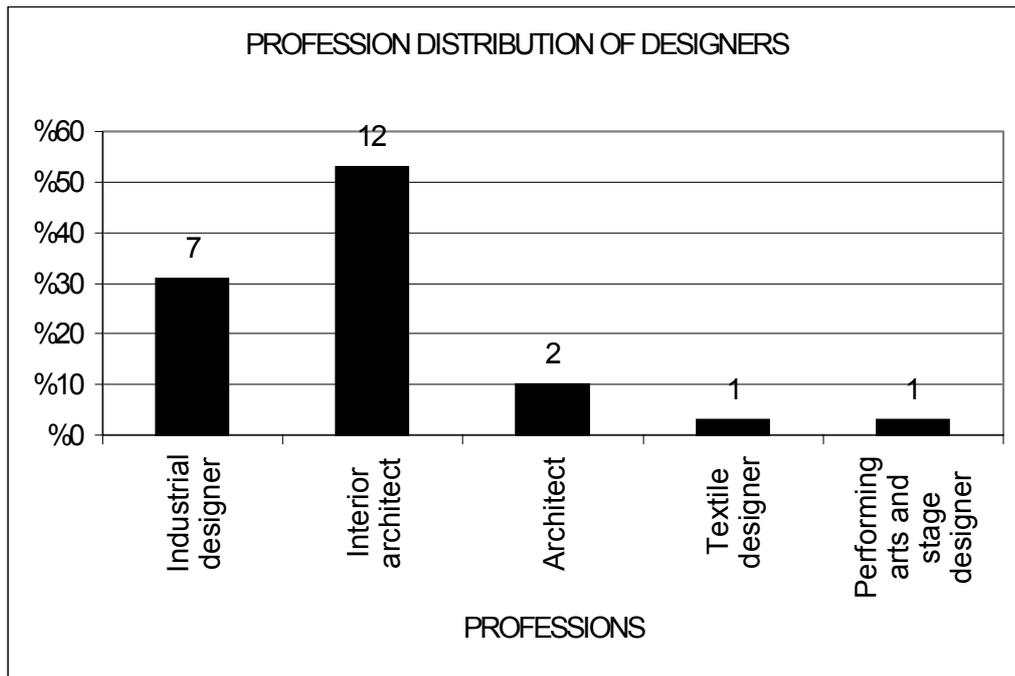
**Figure 6.11. Profession distribution of the designers**
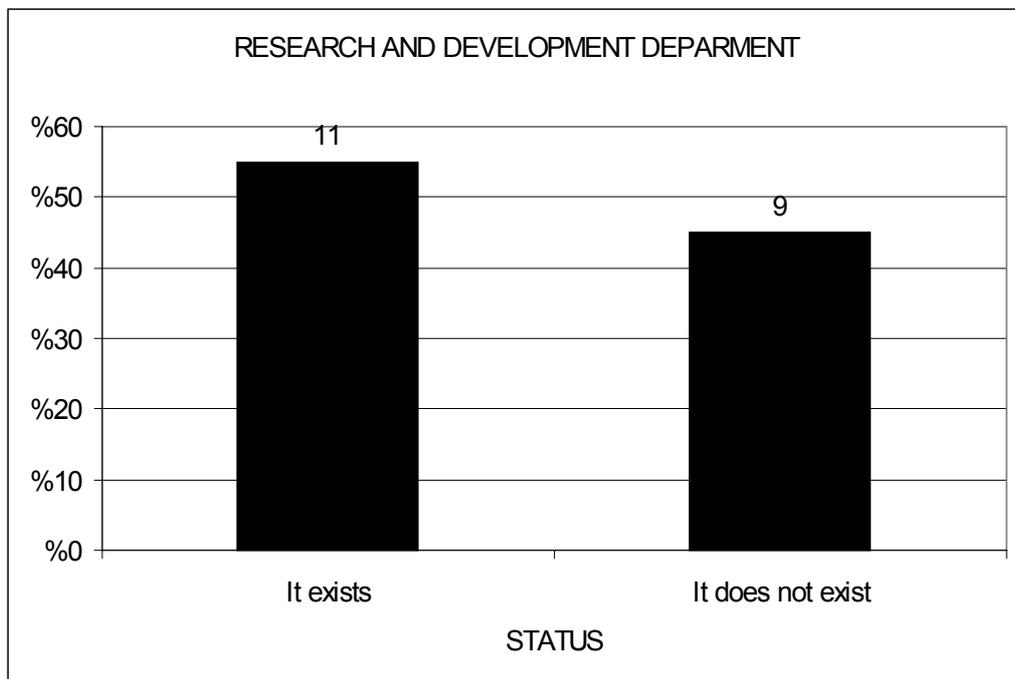
**Figure 6.12. Existence of research and development department**

89
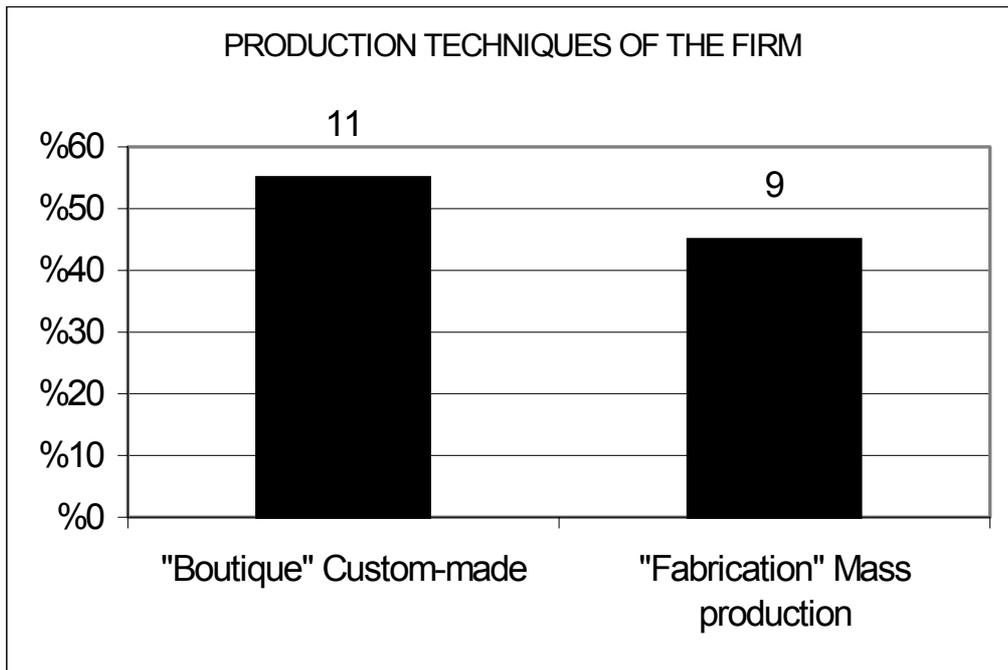
Figure 6.13a. Production techniques of the firms
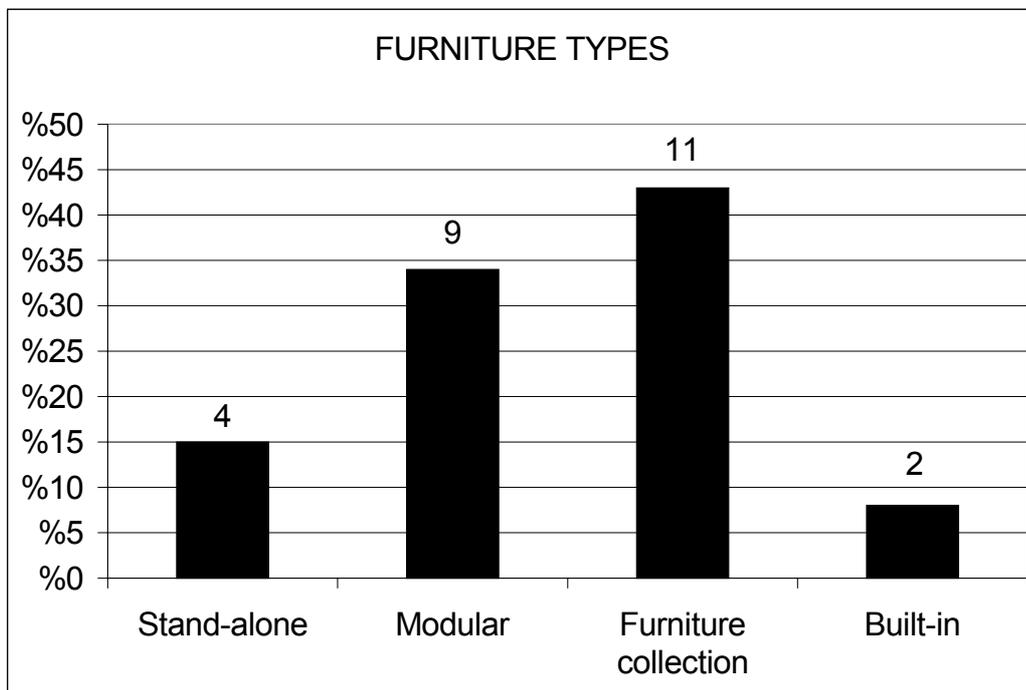
Figure 6.13b. Furniture types of the firms

90
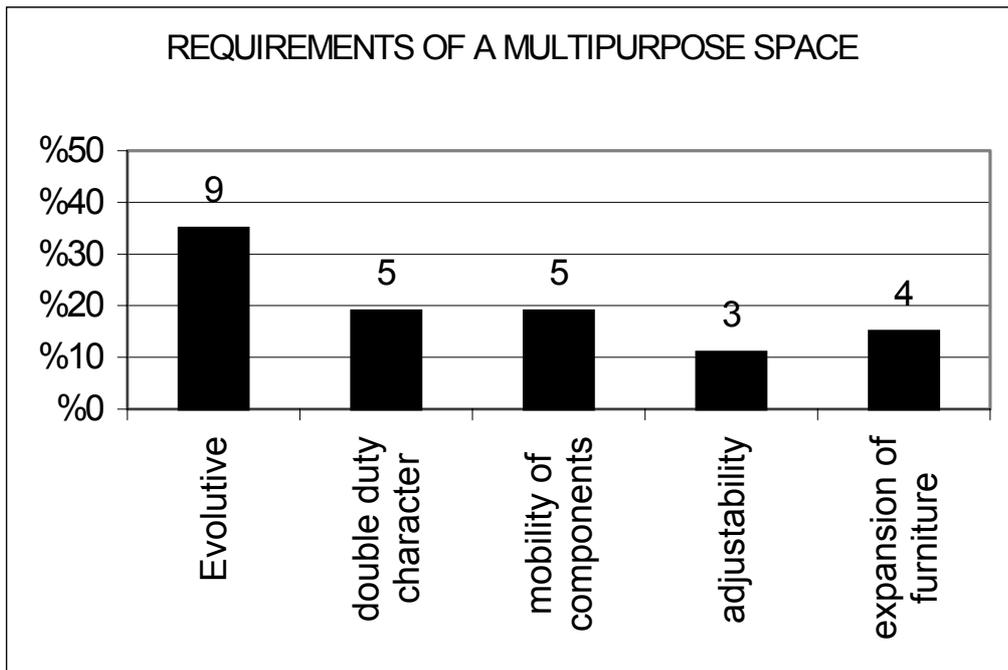
Figure 6.13c. Requirements of a multipurpose space used in the design of the products
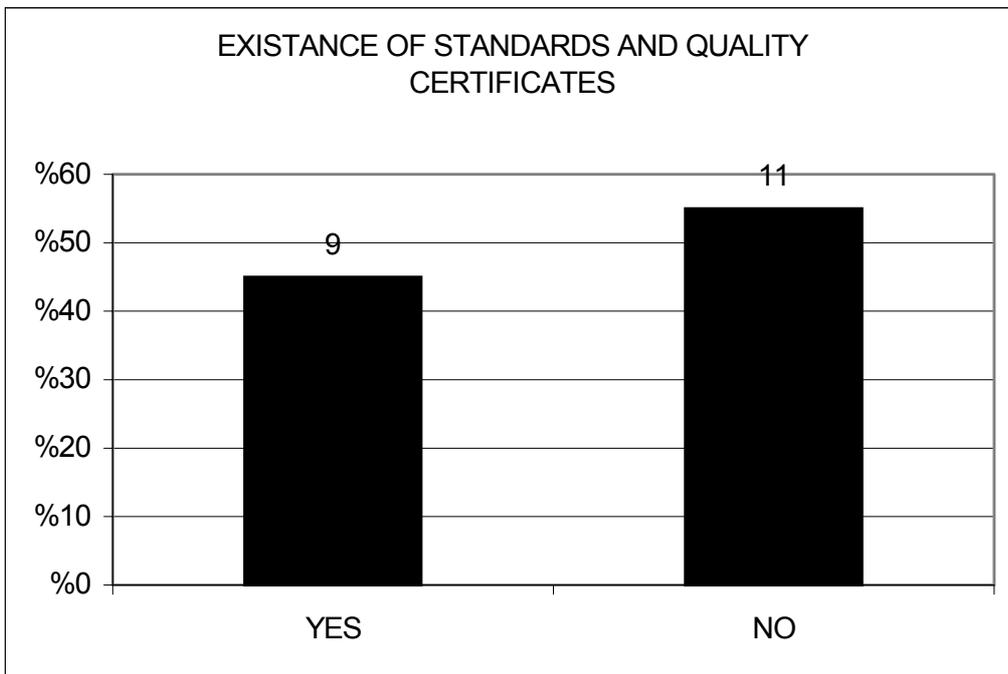
Figure 6.14. Existence of standards and quality certificates in firms for children bedroom furniture

DISTRIBUTION OF STANDARDS AND QUALITY CERTIFICATES
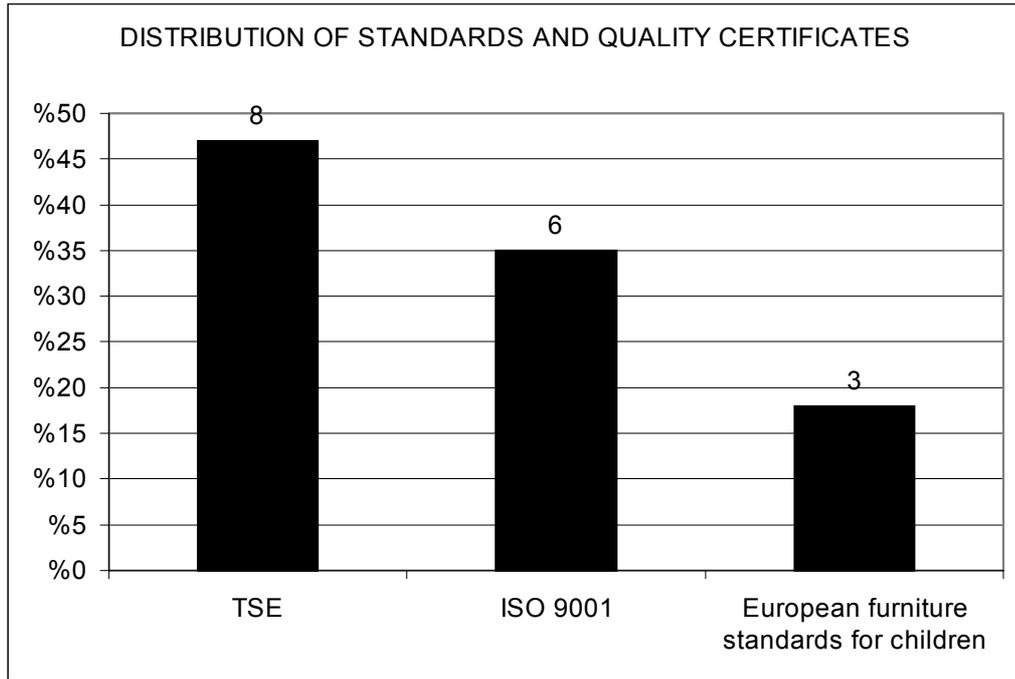
Figure 6.15. Distribution of standards and quality certificates

CONSTRUCTIONAL MATERIALS
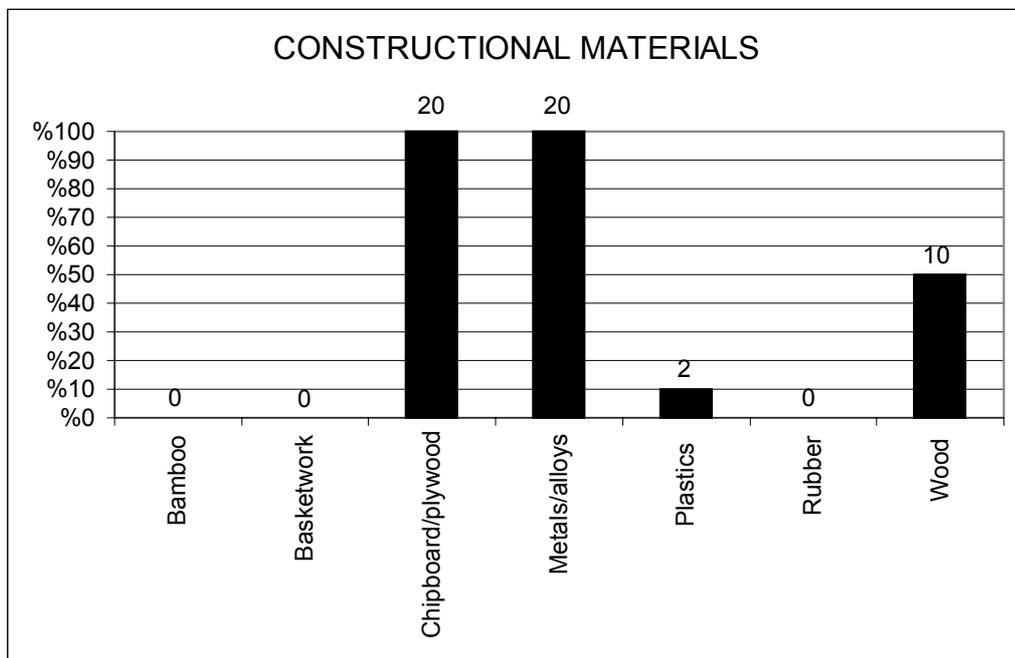
**Figure 6.16a. Constructional materials**
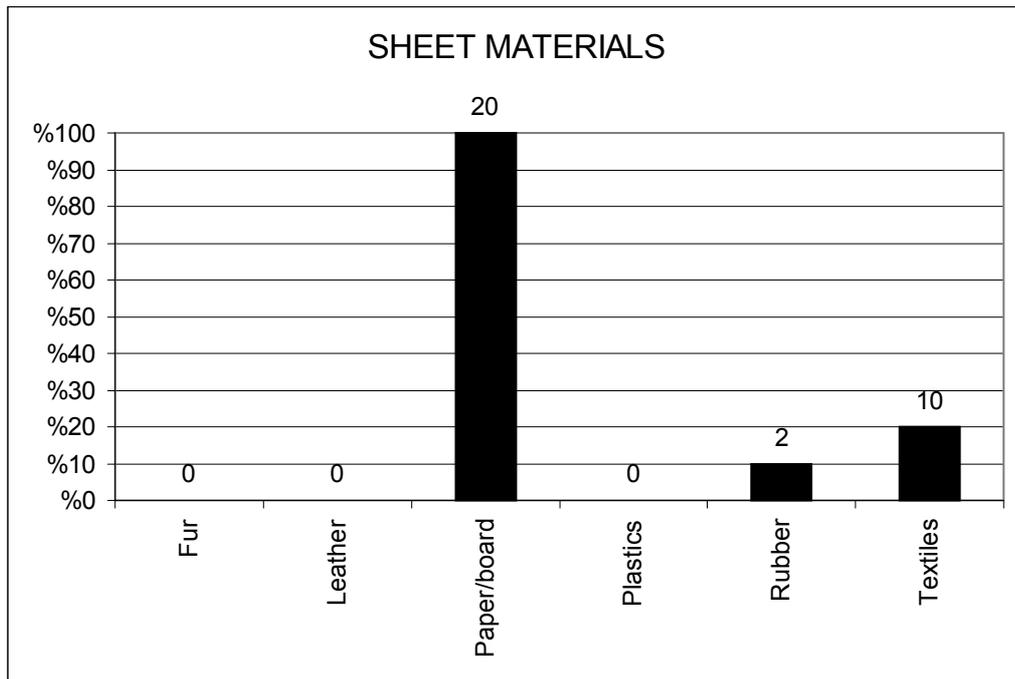
**Figure 6.16b. Sheet materials**
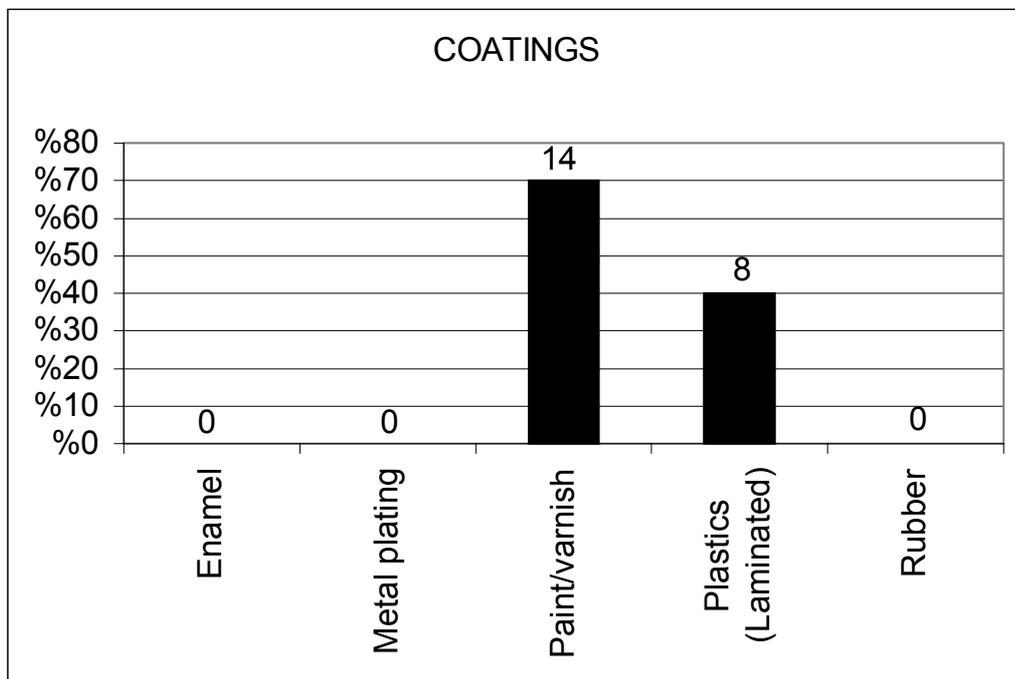

Figure 6.16c. Coatings
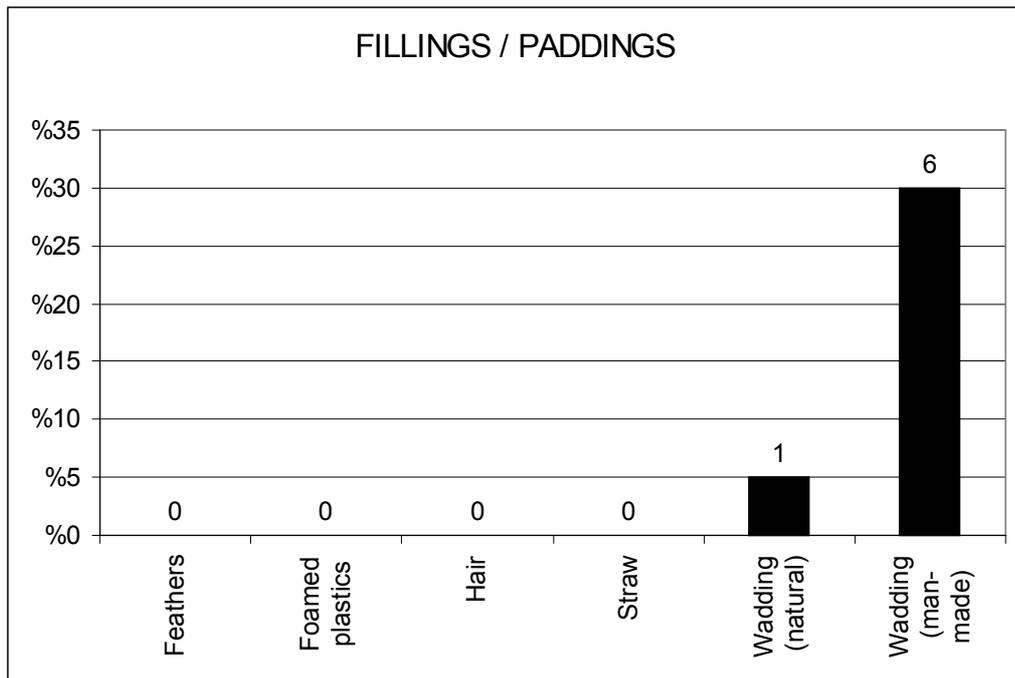
Figure 6.16d. Fillings/Padding
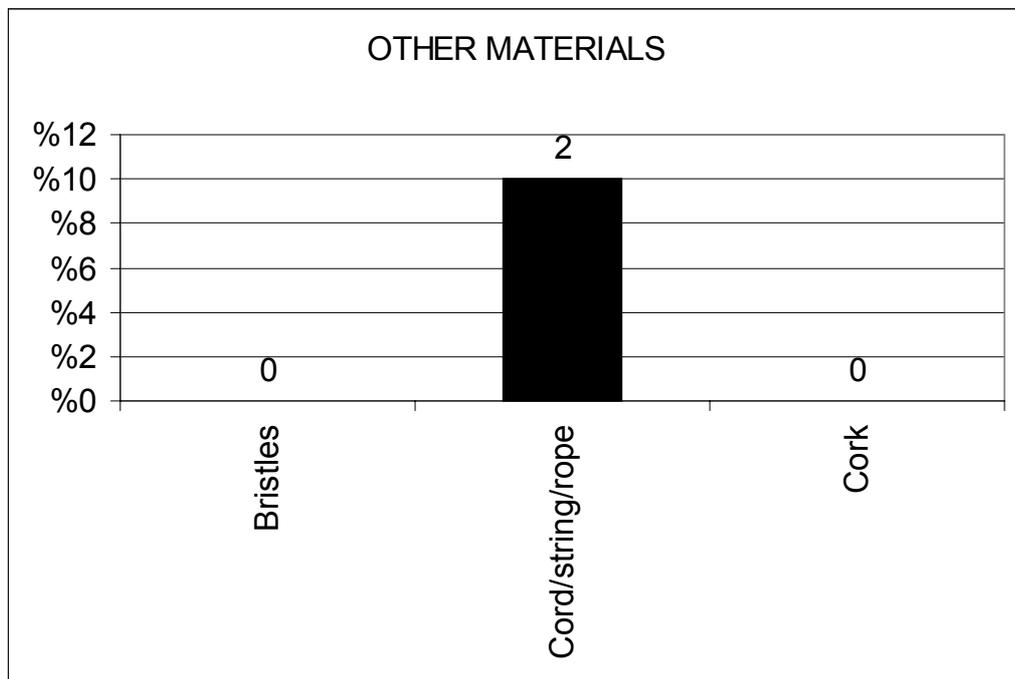

Figure 6.16e. Other materials
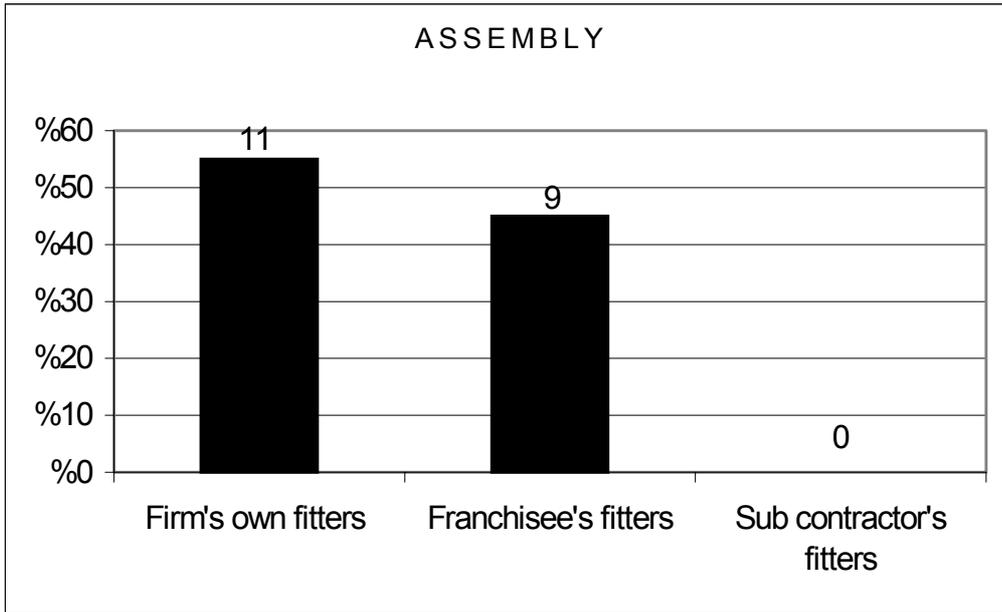
Figure 6.17. Assembly
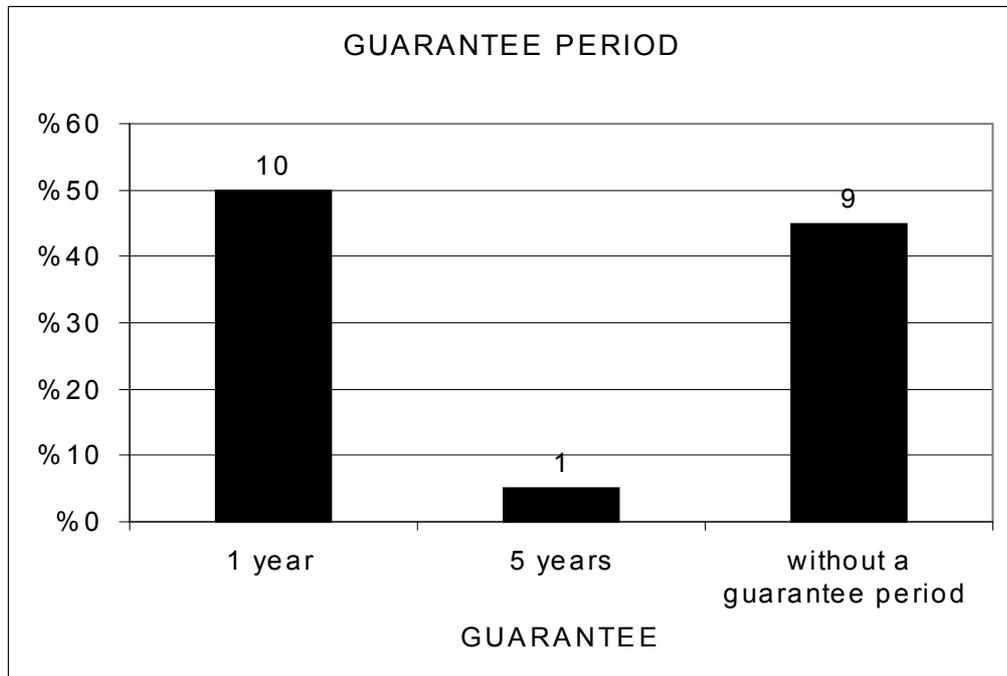
Figure 6.18. Guarantee period

95
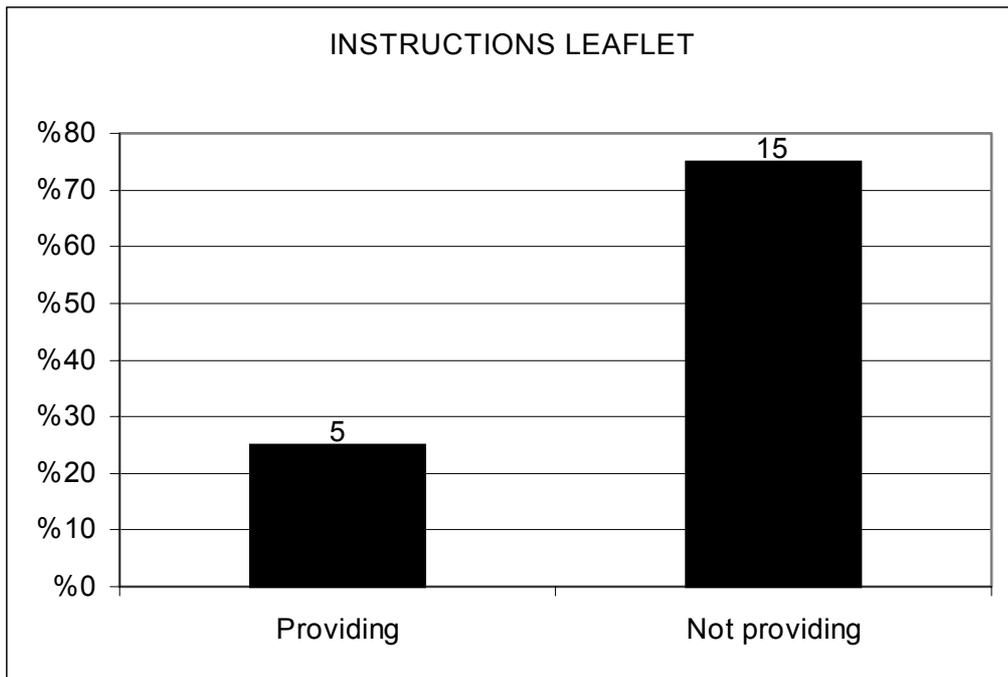
Figure 6.19. The percentage of the firms providing instructions leaflet
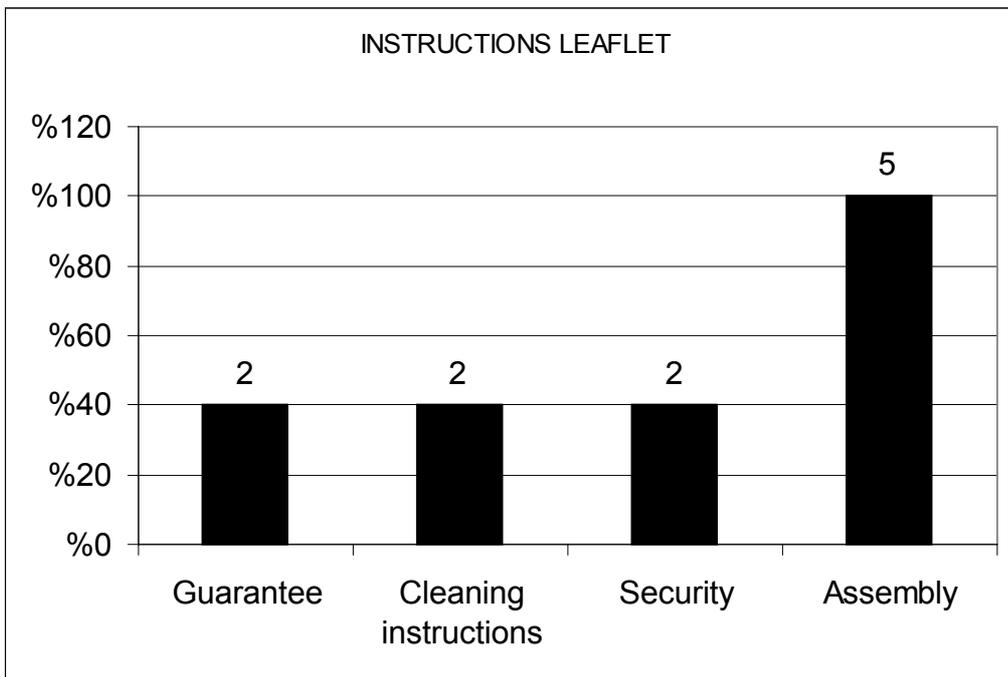
Figure 6.20. The content of the instructions leaflet

6.3.2. OUTCOMES FROM INTERVIEWS

Since the survey type of the field research is a non-scheduled standardized interview, the interviewer has chance to gain more information from the respondents than a regular questionnaire survey. First one of these gathered interview data is the relationship between the selection of the color and the supportive products. Most of the "boutique" type firms explain that they decide on the color of their products according to the colors of the supportive products that they supply. This is a way to market their products by the help of these supportive products, so they claim that this kind of a marketing technique can easily attract the customers, since colors of the furniture and the products can suit each other easily and constitute a whole in a child's bedroom. The other data gathered via interview is about the duration of the new product development in the firms. Most of the medium-scaled firms, as they are also named as "boutique" type firms, explain that they can change their design of the products immediately, at most in a month and serve a new product to the market in two months' time. The reasons behind this rapid manufacture are the lack of the research and development department in the firms and the lack of the usage of standards and the quality certificates. On the other hand, for the large scaled firms, new product development and their presentation to the market take at least one year, since these processes are working more complicated and detailed in an ordered organization for them. As the firms discussed that the new product

travels more than one department such as design, research and development, marketing, production etc. until it is ready to be presented in the showrooms. From the interviews, it is also concluded that 50% percent of the designers of the respondent firms, work for marketing purposes in the showroom areas. Their main duty is dealing directly with the customers and their needs. The 30% percent of them work only for designing the products of the firms. The large scaled companies constitute this percentage, since they separate their design departments from the marketing departments. The rest, 20% percent work both for marketing and designing purposes, which is mainly seen in the medium-scaled firms.

While conducting the field research part of this thesis, there were some limitations that affect the development and the conclusion of the study. At the beginning, it was hard to get an appointment from the respondents of the firms. Since it was vital for the field research to interview especially with the designers, in some firms because of administrational problems, it became impossible to contact directly with the design team. Instead of the designers, the sales managers were chosen as the respondents of the firm or the owner of the firm preferred to attend the interview by himself. Furthermore, the field research was including a dimensional control part for the furniture to check whether the firms using the standards on their products or not. Most of the firms did not let taking the dimensions of their products even for the controlling reasons, since the

firms were afraid of the copying purposes. Therefore, this part was left outside of the field research.

CHAPTER VII

CONCLUSIONS

7.1. CONCLUSIONS

In this research, the design requirements for children bedroom furniture of the preschool period was examined with an analysis of today's children furniture market in Turkey. Children's rooms are the places in which children are the main active users. Therefore, the decisions about the design of these environments should be made by the consideration of young children as the primary user while still regarding the existence of the adults. The aim of this study is to point out the main design principles, which are consistent with the need and expectations of the young children between the ages of 2 to 6 years old.

Within this framework, the characteristics and properties of preschool period children are studied from the motor, cognitive, and social developmental points of view. To stress out the necessity of child-mind evaluative approach in the design of preschool environments, the approach of children to environment has been discussed in detail.

Examining the need and the purpose of the bedroom environment were the second step. Following this, the activities that are done in a children bedroom environment were determined as sleeping, playing and tidying up. In addition, the concepts that can be used to develop a bedroom environment of a preschool child were determined. Bedroom environment should provide necessary conditions by which beneficial and long lasting effects are evaluated for the development of children. The environment is the vehicle for learning, and it must provide the materials the child needs for exploration and learning. Through this approach, the design considerations in a multipurpose space have been stated.

The necessary items of furniture and the required domains were examined to build up this environment. The items are defined according to the activities of the environment as the beds, working surfaces and sitting units and storage units. The domains of standards, anthropometric dimensions, materials and finishes, safety and color were analyzed according to the requirements of the preschool period children.

Under the scope of these data, the design requirements of a children bedroom environment for the preschool period were determined. With the help of this collected data, the Turkish children furniture market was analyzed.

First, as an outcome of the research, it can be concluded that there is a developing sector as children bedroom furniture in Turkish market. These firms are not only producing for the Turkish market, also for export to other

countries. The export facility is done by large scale firms mostly located in the Anatolian part of Turkey, excluding the capital city, Ankara. The other firms, which are medium sized, are working for the Turkish market. All of the firms design and manufacture the products by themselves, but this is not the case for the assembly. The large scale firms prefer using their own franchisees for the assembly service, since the medium sized firms give this service by themselves. The variety of the objects in the bedroom environment affects the cognitive development of the children (Parke, 1980). As to increase the varieties, firms are selling supportive products and they evaluate them as the complementary elements for the children bedroom environment. Lamps, wallpaper and tissue and textile products are the most preferred supportive products, since they can be matched easily to the concept of the bedroom environment. Most of the firms are using brochures and internet web site as the main advertisement technique. Moreover, the large scale, exporting firms prefer attending to international fairs, and giving commercials to magazines, newspapers and televisions.

Secondly, firms are analyzed according to the characteristics of their design process. The results clearly suggest that all of the firms are aware of the importance of employing a designer in their body. 85% of them employ designers mainly from the professions of interior architecture and industrial design. In addition to design department, half of the firms contain a research and development department to utilize the standards and

quality certificates to the products of the designers. These departments mainly use TSE and ISO 9001 standards and quality certificates for standardization process. Firms for children bedroom furniture can be divided into two groups according to their type of production, as "boutique" and "fabrication". In the children furniture market, "boutique" term is used for the custom-made production and the "fabrication" term is used for the mass production. Since "boutique" type firms prefer designing furniture collection, the "fabrication" types choose modular furniture as the furniture type. These types have great effects on the design of the furniture and by the way the selection of the material. The common property that is used in the design of the furniture is convertibility. The adults prefer furniture that can be converted into other forms and different arrangements as the child is growing up and the needs are changing. Therefore, the firms prefer designing convertible and adjustable products for the children's bedrooms.

Thirdly, from the manufacturing process, the "boutique" type firms prefer using lacquered paints with MDF (middle density fiberboard) and massive wood. With these materials, all of the shapes and textures can be given to the product according to the need and desire of the adults and the children. In addition, there is a wide variety of alternatives to color the products. Since there is no standard manufacturing, it is not common for the firms to use the standards directly and follow up all of the requirements of the quality certificates. In the manufacturing process of these "boutique" type firms, the main problem is the selection of the appropriate paints for

the coloring process. On the contrary, the "fabrication" type firms use laminated board, since this material is much more appropriate for rapid manufacturing. The color of the boards can be in different alternatives, but the application on the products is more limited than lacquers. In Turkish furniture market, the fabrication type firms name their manufacture as "panel furniture" which is coming from the main material used. On the other hand, all of the firms are giving guarantee for their products beginning from one-year period, as it is the necessity of TSE certificate. The firms, which do not have a quality certificate, especially the boutique type firms, do not give any time limitation for the guarantee period, and the guarantee period has to depend on the lifetime of the firm itself in the market. If the firm decides to go bankrupt after the customer purchases the furniture, the customer would not be able to find a respondent when the furniture needs a service. Also giving an instructions leaflet to the customer including the details of the products is not common in Turkish children furniture market, although it is very useful for the both sides as the manufacturer and the user for an undesired occasion.

It can be concluded that "boutique" type firms are not using the standards and the quality certificates exactly, since they are selling their products only to the Turkish market, and unfortunately, in the Turkish market, the firms are not obliged to follow-up such regulations. On the other hand, as the "fabrication" type firms need fully standardized organization and products' line, they have to use the regulations of the

standards and the quality certificates strictly. This application gives firms the opportunity to export their products to other countries. In addition to this, it is a necessity for the firms following up the standards and quality certificates to constitute research and development departments, as the application of them needs a specialized knowledge and practice.

Moreover, all of the firms following the standards and quality certificates have research and development departments in their plant. This enables the firms to apply the regulations correctly. Despite of this positive intention, from the total respondent number of 20, there is only one firm who gained right to use the labels of the special children bedroom furniture standards, such as EN 747-1/2:1993 and EN 1130-1/2:1996. In this unique firm, each time they design a new product, the products are sent to a special institute in Germany to be analyzed and tested in accordance with the regulations.

In the light of this research, it can be stated that, a comfortable, safe and stable environment that is designed by adequate considerations can provide both the psychological and physical needs of the preschool children. This kind of an environment can start the education process long before the formal school period and give children the opportunity of being active to explore the environment around them, which would stimulate and support their cognitive, motor and social development. Furthermore, the survey of the Turkish producers of children bedroom furniture shows an appreciable level of consciousness in regard of this. Findings of the field

research indicate awareness for the necessity of designer services that are sensitive to design criteria for children and to relevant standards.

7.2. FURTHER STUDIES

In the information collecting stage, it was found that there is no data about the anthropometric dimensions of Turkish preschool children. Thus, a scientific study must be done to determine these dimensions, to be used in the design process of the Turkish preschool children environments.

Secondly, a research should be made to find out the way to cherish the families to learn more about the accidents related with the children furniture. In Turkey, reliable data on accidental injury adjusted to the different age groups are still missing. Research on prevention should be made and be based on evaluation of unintentional injury mortality. The most important step in preventing injuries in Turkey is overcoming a sense of fatalism that regards injuries as random events that cannot be predicted, since there are informative standards and design and safety guidelines both for the families and for the manufacturers.

In this thesis, producer and marketing firms of the children bedroom furniture sector are analyzed. Therefore, Turkish users as the families and the children can be another topic for a prospective research. The criteria behind the selection of the type and color of the children bedroom furniture can be studied from the families' and the children's point of view. It can include comparisons in between the opinions of the families and the

children and the opinions of the producer and supplier on the same product.

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ORTA DOĞU TEKNİK ÜNİVERSİTESİ
ENDÜSTRİ ÜRÜNLERİ TASARIMI BÖLÜMÜ

ÇOCUK ODASI MOBİLYASI ÜZERİNE ÇALIŞAN FİRMA ANKETİ

AÇIKLAMALAR:

1. Bu testten elde edilecek bilgiler, Orta Doğu Üniversitesi Mimarlık Fakültesi Endüstri Ürünleri Tasarımı Bölümü'nde sürdürülen bir araştırmada kullanılacaktır.
2. Bu test, sadece *çocuk mobilyası üretici firmaları* ve *bu firmaların ürünlerini* değerlendirmek içindir. Kullanıcıların *yetenekleri, kişilikleri, cinsiyetleri* vb. ile ilgili herhangi bir değerlendirme *kesinlikle* bulunmamaktadır.
3. Test kullanıcılarının kimlikleri tamamen *gizli* tutulacaktır.

A.FİRMA BİLGİLERİ

FİRMANIN;	
ADI:	

ANKETİ DOLDURANIN;	
ADI, SOYADI :	
FİRMADAKİ ÜNVANI:	

1. FİRMANIZ KAÇ SENEDİR "ÇOCUK YATAK ODASI MOBİLYASI" SEKTÖRÜNDE ÇALIŞMAKTADIR?	
☐ 0-5 YILDIR	☐ 6-10 YILDIR
☐ 10 YIL VE ÜSTÜ	

2. FİRMANIZ "ÇOCUK YATAK ODASI MOBİLYASI" SEKTÖRÜNDE;	
☐ SADECE TASARIM YAPMAKTADIR.	☐ SADECE ÜRETİM YAPMAKTADIR.
☐ SADECE MONTAJ YAPMAKTADIR.	☐ TASARIM VE ÜRETİM YAPMAKTADIR
☐ TASARIM VE MONTAJ YAPMAKTADIR.	☐ ÜRETİM VE MONTAJ YAPMAKTADIR.
☐ TASARIM, ÜRETİM VE MONTAJ YAPMAKTADIR.	

3. FİRMANIZIN SADECE "ÇOCUK YATAK ODASI MOBİLYASI" TASARIM/ ÜRETİM/ MONTAJINDAN ELDE ETTİĞİ YILLIK SATIŞ MİKTARI AŞAĞIDAKİ ARALIKLARDAN HANGİSİNE GİRMEKTEDİR?	
☐ 200 MİLYAR VE ALTI	☐ 200MİLYAR-500 MİLYAR ARASI
☐ 500 MİLYAR-1 TRİLYON ARASI	☐ DİĞER………………………..........

4. FİRMANIZDA TOPLAM KAÇ KİŞİ ÇALIŞMAKTADIR?	
☐ 10 KİŞİYE KADAR	☐ 10-50 KİŞİ ARASI
☐ 50-100 KİŞİ ARASI	☐ 100 KİŞİ VE ÜSTÜ

5. FİRMANIZ 1 YILDA YAKLAŞIK OLARAK KAÇ ADET "ÇOCUK MOBİLYASI" TAKIMI SATMAKTADIR?	
☐ 100 TAKIMA KADAR	☐ 100-500 TAKIM ARASI
☐ 500 TAKIM VE ÜSTÜ	

6. FİRMANIZIN ÜRÜN YELPAZESİNDE HANGİ TİP ÜRÜNLER BULUNMAKTADIR?	
☐ YERLİ ÜRÜN	☐ YABANCI ÜRÜN
☐ DİĞER...	

7. MOBİLYALARINIZI DESTEKLEYİCİ ÜRÜNLER DE SATIYOR MUSUNUZ?		
☐ EVET	☐ HAYIR	
BU ÜRÜNLER NELERDİR?		
☐ OYUNCAK	☐ DUVAR KAĞIDI,KUMAŞ	
☐ AKSESUAR / HALI	☐ AKSESUAR / LAMBA	☐ AKSESUAR / TEKSTİL ÜRÜNLERİ

8. FİRMANIZ TANITIM İÇİN HANGİ ARAÇLARI KULLANMAKTADIR?	
☐ TANITICI BROŞÜR DAĞITIMI (EL/POSTA İLE)	☐ FUARLARA KATILIM
☐ GAZETE,DERGİ,TV,RADYO REKLAMLARI	☐ SEMİNER VE TANITICI TOPLANTILAR
☐ WEB SİTESİ (www...)	

B.TASARIM BİLGİLERİ

9. FİRMANIZDA TASARIMCI ÇALIŞTIRIYOR MUSUNUZ?	
☐ EVET	☐ HAYIR

10. FİRMANIZDA ÇALIŞAN TASARIMCILAR ÜNİVERSİTELERİN HANGİ BÖLÜMLERİNDEN MEZUN OLMUŞLARDIR?	
☐ ENDÜSTRİ ÜRÜNLERİ TASARIMI	☐ 1İÇ MİMARLIK
☐ MİMARLIK	☐ DİĞER..

11. FİRMANIZDA AYRI OLARAK ARAŞTIRMA –GELİŞTİRME DEPARTMANINIZ VAR MI?	
☐ EVET	☐ HAYIR

12. ÜRÜNLERİNİZDE TABLODAKİ ÖLÇÜTLERDEN HAGİLERİNİ KULLANMAKTASINIZ?
TABLO 1 KULLANILACAKTIR.

13. ÜRÜNLERİNİZDE HANGİ RENKLERİN KULLANILACAĞINA NASIL KARAR VERİYORSUNUZ?

14. ÜRÜNLERİNİZİN TASARIMINDA ÇOCUK GÜVENLİĞİ VE SAĞLIĞI AÇISINDAN SİZE REHBERLİK EDEBİLECEK BAZI STANDARTLAR VAR. BUNLARI KULLANIYOR MUSUNUZ?	
☐ EVET	☐ HAYIR

15. AŞAĞIDAKİ STANDART VE KALİTE BELGELERİNİN HANGİLERİNİ KULLANMAKTASINIZ?		
☐ TSE	☐ ISO 9001	☐ Çocuk mobilya standartları (EN, ISO vb.)

C. İMALAT BİLGİLERİ

16. ÜRÜNLERİNİZDE NE TÜR MALZEME KULLANIYORSUNUZ?
TABLO 2 KULLANILACAKTIR.

17. MOBİLYALARINIZIN İMALATI KENDİ BÜNYENİZDE Mİ YAPILIYOR?	
☐ EVET	☐ HAYIR ....

18. MOBİLYALARINIZIN MONTAJI KİM TARAFINDAN YAPILIYOR?	
☐ FİRMANIN KENDİ MAAŞLI ELEMANLARI	☐ FİRMANIN ANLAŞTIĞI MONTAJ FİRMASI
☐ FİRMANIN ANLAŞTIĞI ELEMANLAR	☐DİĞER………………………………

19. SATIŞ SONRASI SERVİS VERİYOR MUSUNUZ?	
☐ EVET	☐ HAYIR

20. SATIŞ SONRASI MÜŞTERİLERİNİZE VERDİĞİNİZ BİR GARANTİ PERİODU VAR MI?	
☐ EVET	☐ HAYIR

21. GARANTİ PERODUNUZ SATIŞTAN SONRA NE KADAR SÜRMEKTEDİR.?		
☐ 1 YIL	☐ 3 YIL	☐ 5 YIL
☐ 2 YIL	☐ 4 YIL	☐ Belli bir süre yok

22. MÜŞTERİLERİNİZE ÜRÜNLERİYLE İLGİLİ KULLANMA KLAVUZU VERİYOR MUSUNUZ?	
☐ EVET	☐ HAYIR

23. KULLANMA KLAVUZUNUZUN AŞAĞIDAKİ BİLGİLERDEN HANGİLERİNİ İÇERİYOR?	
☐ GARANTİ BİLGİLERİ	☐ TEMİZLEME BİLGİLERİ
☐ GÜVENLİK BİLGİLERİ	☐ MALZEME KULLANIMI

TABLO 1								
SORU 12		**FİRMALAR**						
BÖLÜM	**ÖLÇÜTLER**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
1 Üretim tekniği	"Butik" Özel üretim							
	"Fabrikasyon" Seri Üretim							
2 Mobilya çeşitleri	Hareket edebilen tek parçalık mobilya							
	Modüler mobilya							
	Koleksiyon mobilya							
	Özel üretim mobilya							
3 Çok amaçlı ortam için gerekli özellikler	Başka bir alternatife dönüşebilme							
	Birden fazla amaca hizmet verebilme							
	Hareket edebilme							
	Ayar edilebilme							
	Ek ünitelerle genişleyebilme							

APPENDIX C

TABLO 2							
ÜRÜNLER	**FİRMALAR**						
	A	**B**	**C**	**D**	**E**	**F**	**G**
Yapısal malzemeler							
Bambu							
Hasır							
Sunta / kontraplak							
Metaller / alaşımlar							
Plastik							
Lastik							
Ahşap							
Tabaka malzemeler							
Kürk							
Deri							
Kağıt / tahta							
Plastik							
Lastik							
Tekstil							
Kaplamalar							
Parlatıcı boya							
Metal kaplama							
Boya / vernik							
Plastik							
Lastik							
Dolgu / Döşeme Malzemeleri							
Tüy							
Plastik köpük							
Kıl							
Saman							
Sünger (naturel)							
Sünger (yapay)							
Diğer malzemeler							
Sert kıl							
Tel / ip / halat							
Mantar							