

Toy Furniture Design

Dr. Dalia Sami Thabet Georgy

Associate Professor in Interior Design and furniture, dr.daliasami0@gmail.com

Abstract:

Furniture was not limited to carrying out its basic functions of observing the standards of the human body or providing comfort to the user and taking into account the aesthetic aspects of the use such as colors or the effects of materials used and other requirements that are based on the design. And in the midst of these developments of manufacture furniture there are other types of enjoyment appeared in the functions of furniture provided such as a toy or measurement of behavior or that helps children reduce excessive obesity also there are pieces of furniture provided with smart screens connected via the Internet and through it access to data and Infinite games and the matter did not stop at that, but it was possible to use the electronic dynamic three-dimensional screens and by using movies prepared for the three-dimensional holograms that float on or above the screen using a hologram and can thus be installed on the furniture pieces in order to achieve pleasure and enjoyment in the resting places or waiting area . Also toy furniture can be made by Recycling industry which has a dual relationship with the environment in the extent of efficiency in the use of resources and the resulting which effects on the environment so we can access competitive, which means the progress of the economic and the research will focus on the furniture design as toys and explain the different types of them and how does it affect on users also uses of Recycling industry for making toy furniture. **The problem lies** in Lack of information on the foundations, principles and classifying of designing toy furniture and the extent to which it can be used in education, health and other sciences, The shortage of knowledge about the physical and psychological impact of entertainment in game furniture design, How to benefit from environmental recycling material in making toy furniture designs. **The research aims** to Study and explain the general concept of toy furniture design and factors affecting on it and studies some selecting item of toy furniture design, Clarify The impact of the entertainments in the toy furniture design , Study of environmentally friendly recycled materials according to the design of game furniture.

Keywords:

Furniture design
games and toys
entertainment
recycled toys
Hologram technology
furniture

Paper received 25th September 2020, Accepted 1st January 2021, Published 1st of March 2021

Introduction:

Recently, the use of Furniture design has not been only limited to carrying out its basic functions of observing the standards of the human body to provide comfort to the user (19) , taking into account the aesthetic aspects such as colors or the texture of the materials used in the design, implementation, manufacturing and other design elements, but in the midst of amazing technological developments and based on the conditions for developing a design based on foundations, standards, and methodologies that could help solve problems, create something new, or transform situations in preference to a better position .many jobs have begun to appear that could be added to furniture design and its applications such as toy furniture design that provides more luxury as well as fun and entertainment, whose effect appeared in other fields such as education and behavior

measurement and in some health aspects such as treating depression and other aspects in which entertainment is an influential factor, It was physical or psychological effects

toy furniture design is based on two basic styles in the design, the first type depends on the change in the distribution and shape of the piece of furniture through various materials and colors and the second styles depends on adding digital technological devices which display two dimensional data or games that can be accessed without limits by using smart screens or three dimensional presentations connected via Internet through Using hologram technology,

Also the design and manufacturing of toy furniture has been possible through recycling industries, which have a double relationship with the environment in the extent of efficiency in the use of resources and the

resulting effects, both on the environment and the economy.

The research will address toy furniture design by studying and explaining the general concept of design and the factors affecting it, and clarifying the effect of entertainment means in designing game furniture and the possibility of manufacturing it from environmentally friendly recycled materials

Research Problem:

The problem lies in

- Lack of information on the foundations, principles and classifying of designing toy furniture and the extent to which it can be used in education, health and other sciences
- The shortage of knowledge about the physical and psychological impact of entertainment in game furniture design
- How to benefit from environmental recycling material in making toy furniture designs

Objectives:

The research aims to

- Study and explain the general concept of toy furniture design and factors affecting on it and studies some selecting item of toy furniture design
- Clarify The impact of the entertainments in the toy furniture design
- Study of environmentally friendly recycled materials according to the design of game furniture.

Methodology:

The study uses an analytical descriptive methodology followed by an application by designing some pieces of furniture following the toy furniture design principles

Toy furniture designs

1-1 Toy furniture design concept

Play is a mental or physical activity that an individual undertakes, whether this individual is young or old, in order to meet his different needs, which he can achieve through play, such as entertainment, discharging excess energy and education (3) which can be applied in the designing furniture pieces called toy furniture

So the concept of toy furniture design is to design a pieces of furniture according to the

foundations and principles of designing furniture, provided with the using of playing approaches whether with using elements or materials or fixed parts connected to digital technology (are added to display a two or three-dimensional presentations) to give the characteristic of playing in order to provide luxury, comfort and entertainment whenever possible. Also it can be eco friendly designs by using environmental rotatable materials or recycled items

This type of furniture design and pleasure based approaches may be related to other sciences such as

- Education and understanding of behavior
- Health (through the physical and psychological effects that may occur to the user, especially with depressive diseases resulting from great stress, which are the most prevalent diseases of the age)
- Sciences of mechanics, electricity or technology especially recreational computing and other sciences complementary with the concept of entertainment and furniture manufacturing

So toy furniture designs will deal with a number of new challenges that must be addressed in order to support such approaches perhaps the three major challenges are as follows

Understanding people holistically
Linking product benefits to product properties
Developing methods and metrics for assessing product pleurability (8)

1-2 The toy furniture design categorizing

- toy furniture design with traditional configuration and materials
- toy furniture design using digital technology and equipped with technology to display two-dimensional content
- toy furniture design equipped with technology to display 3D content such as a hologram)

1-3 Toy furniture design depend on forming

1-3-1 Models for Toy like furniture

The first thing that jumps to mind when talking about toy furniture design is the mini

children toys that consist of various pieces of colorful furniture (23) that attract children and are implemented in the same sizes of the original pieces



Picture (1) Models for Toy like furniture

While some of them are used with different drawing scales to make the mini architectural models for different projects (35)

1-3-2 Toy furniture design in home

People's perception of their environment influences their social interaction within that environment (20) so designer seeks first and foremost, to satisfy consumer and fulfill most of his needs while taking into account the technical ways in manufacturing (4)

so one of the toy furniture design's style is to make designs inspired can be inspired from any famous thing like the famous Disney movie which called "Cars " Where is designer made the bed like the shape of the cartoon character (24) which enhance interacting children with things



Picture (2) furniture design inspired from famous cartoon characters

Artists have developed toy furniture elements and invested these elements as decorative units or vocabulary for their formations in decorative designs in a contemporary (17) till

toy furniture became a part of living. It gives the family time for entertainment it was made as traditional toy then the smart furniture replaced it



Picture (3) middle table in the living room used as a toy game

1-3-3 Toy furniture design in Public area

Definition of an individual's interaction levels is one mechanism used in achieving a desired level of privacy. Besides needing enough space to move about and perform various

tasks (14) and that what happened in the Pebble-like seats in pastel hues offer students a place to recline in this recreational area, which Igarashi Design Studio has created for an arts university in Tokyo (27)



Picture (4) Igarashi Design Studio's Zero Space is filled with furniture based on river-weathered pebbles

Also there is a school designed to suit the Montessori approach to teaching, a method that focuses on educating children through play and interacting with their environment where the curvaceous wooden reading dens and lily-pad-like cushions for jumping on are

among the playful features architecture (28) because art is not a mimicking of nature according to the saying attributed to Plato, but rather a revelation or expression of absolute thought in a sensual forms (10)



Picture (5) BIG Company designed the school to suit the Montessori approach to teaching a method that focuses on educating children through play and interacting with their environment

Toy furniture design by reshaping form

Toy furniture can be reshaping in many designs using the furniture piece parts which

can be from the same material and color or can be multi color also can extend to make different forms



Picture (6) different forms from the piece of furniture

Toy furniture can be designed in public area like that bench's base which was made up of three colorful stools that resemble children's building blocks an orange square cuboids, a blue cylinder and a pink cuboids with a curved

side (29) and manufacturing the patterns evolve from time to time as a result of their subordination to economic or industrial factors (2)



Picture (7) toy furniture design like a geometric bench

Toy furniture design with digital technologies

Digital technologies in toy furniture design for example smart screens which gives many



possibilities of integration (15) and the toy furniture became a part from living it gives a time for entertainment whether in home or in public areas



Picture (8) home smart toy furniture tables

2 The impact of the entertainments in the toy furniture design

2-1 Entertainment computing (Digital entertainment gaming)

Entertainment computing it is a new area to get together various types of interdisciplinary research which have been created by (IFIP) (38) it is a discipline whose aim is to combine technology with other areas such as art, culture..... etc with using of the Artificial intelligence which is consider as a fundamental enabling technology for improving the playing experience in several types of games and the core of Entertainment computing is the entertainment Games ,Digital games and Digital arts (6)

2-2 Edutainment and infotainment “gamification”

This is in contrast to education (which is designed with the purpose of developing

understanding or helping people to learn) and marketing (which aims to encourage people to purchase commercial products). However, the distinctions become blurred when education seeks to be more "entertaining" and entertainment or marketing seek to be more "educational". Such mixtures are often known by the neologisms "edutainment (39)" or "infotainment". Some education-entertainment is a serious attempt to combine the best features of the two and the combination of edutainment and entertainment technologies – sometimes called “gamification” – offers new possibilities to educators and learners And we can apply that on the toy furniture designs which became also a part from public places waiting areas or in restaurant or café and many other places which focus on giving entertainment to client



Picture (9) Smart toy furniture in public area

also (STEM) it is a serious games are one of the most promising areas in bridging the gap between enjoy full play and professional use through “gamification “which include regarding science, technology, engineering, and mathematics (13)

2-3 Exploratory Behavior and learn

Motives are those driving forces within people that drive them to behave in a specific direction as a result of their exposure to different environmental products Where Motivation is a biological psychological force within the individual that urges him to undertake a specific activity to satisfy a specific desire, and this force continues to

push the individual and direct his behavior until his desire is satisfied (1) as Tawfiq al-Hakim says that the art serves society without losing an atom of its higher artistic value the aesthetic value is the ability of a thing or its strength to cause a certain type of aesthetic response which capable to response an express behavior

Art as Tawfiq al-Hakim says is the art that serves society without losing an atom of its higher artistic value the aesthetic value is the ability of a thing or its strength to cause a certain type of aesthetic response in scenes capable of this response (22) which happen to express behavior

2-4 Chairs designed for the peculiar behaviors

like the chairs designed to focus on the subtleties of body language and gesture rather than big movements and bright colors to show to that they are meant to be a playful and explorative extension of simple human behaviors (30)

the chair which features a large outer circle and two smaller rings This shape came from an observation that the seated body often requires a good, deliberate stretching .second chair which has arms that extend vertically outwards to allow the user to occupy space beyond the seat itself,

third one is designed to rock forwards to help the user stand up from a work desk when the weight of the body is already leaning forwards .yellow chair has Pedals are tucked under to allow a user to bounce their heels up and down if their legs feel restless

The weight of the body often appears to the left right or back when People sit or rest while they interact with others In order to make this restless movement more comfortable, Hu designed a light green chair with a curving, padded back rest that allows the user to lean their back against the chair at any angle



Picture (10) Tsinghua University furniture design graduate Yuming Hu has created a range of chairs designed for the peculiar behaviors’ of different users Hu’s chairs were exhibited at the Design China Beijing exhibition as part of Beijing Design Week 2018

2-5 Desk designed for specific behaviors

In a study for students behavior while learning they found students with standing desks are more attentive than their seated counterparts it

means to reduce childhood obesity and relieve stress on spinal structures that may occur with traditional desks (36)



Picture (11) study from the Texas A&M Health Science Center School of Public Health

2-6 folding unit designed for specific behaviors

This toys help fine motor skills with learning their own facial expressions and encourage

Imagination stimulate creativity for children in daycare or at home with shatter-resistant mirrors



Picture (12) Triangular design of the Toddler Play Center

Easy to Transport folding design with a velcro closure to easily move from one spot to another (25) Triangular design provides a stable base for pull-up and walk-around first steppers and features rounded corners and edges for safety

Stationary unit allows plenty of roomy storage on one side and a full-length, extra-safe, acrylic mirror on the other. Top ledge helps keep toys off the floor (40) and the triangular design provides a stable base for pull-up and walk-around first steppers rounded corners and edges for safety (26)



Picture (13) Triangular design provides a stable base for pull-up and walk-around

2-7 The psychological and physical impact

Entertainment can be seen as a public health issue because People who have been allowed and encouraged to play stand the best chance of becoming healthy, happy and productive members of society (7) and it is also used as a cognitive intervention and some positive aspects of playing can promote literacy, thinking, reflecting and creativity especially for kids (5)

Among the demonstrated skills and benefits of games are as follows

- Hand-eye coordination and reaction time and Task switching
- Games require the use of logic, memory, problem solving and critical thinking skills, visualization and discovery and according to “Goldstein more than 40 studies concludes that play enhances early development by at least 33% (18)
- Gaming in 2D or 3D applications contributes to positive cognitive effect have been consistently observed in visual-spatial skills and Spatial visualization

- Visual attention, search strategies perception and the use of visual information

Also gaming can be beneficial for brain development and functioning in which the positive effects of gaming may also prove relevant in therapeutic interventions targeting psychiatric disorders; particularly depression because Entertainment is relieves stress and one of the best treatments and distractions to get over it. Especially when getting quality entertainment mind thinks of other things, and releases endorphins, hormones that are responsible for feeling good. This is a better way to deal with stress, as it gives some time off to relax and prepare mind for recovery (37) and the effect of this is more effective if these games are part of the furniture that we deal with like toy furniture designs

2-8 The economical impact of the entertainment in designing toy furniture

Entertainment products have not only a technical and economical impact but also an enormous societal impact as Johan Huizinga

showed in his book Homo Ludens that playing is the basis of our culture also the psychologist Mihaly Csikszentmihalyi indicated in his "Flow Theory." that the entertainment market is huge like interactive TVs, movies ,smart toys....etc (21) and it affects on the economic aspects and attract huge investments to finance it, whether in its manufacture or presenting it to society, which had a great impact on the economic return and the revitalization of digital technology fields, and also in the manufacture of different types of games, including create a new type of furniture design which is toy furniture design

3 Toy furniture designs depend on Recycling

Recycling industry has a dual relationship with the environment in the extent of efficiency in the use of resources and the resulting effects on the environment so we can access sustainability (16) which impact on the encompass life cycle in both of the progress economic (9) and environmental aspect

Recycling industry has a dual relationship with the environment in the extent of efficiency in the use of resources and the

resulting effects on the environment so we can access sustainability which impact on encompass life cycle in both of the progress economic and environmental aspect and that became clear special in 2016 child-focused furniture and toys dominated Milan Design Week when Kartell president and CEO Claudio Luti told Dezeen: "It is a huge market with very high potential

Since then, numerous design products aimed at children have launched with the general design principle is give benefit element and beauty as basic condition that must be fulfilled

3-1 Reshaping toys for making Toy furniture

So you can save time and money on maintenance and replacement costs as well as helping the environment Recycling plastic into useful products one day is the future (33) and with an overarching goal of introducing children to the circular economy Antwerp based brand Ecobirdy chas used recycled plastic toys to create a range colorful furniture for kids, aiming to raise their "awareness for sustainability" all the pieces are made from old plastic toys and are completely recyclable (11)



Picture (14) The Duck Table, part of the Recycled Toy Furniture installation at the 2008 Venice Biennale ecoBirdy’s award-winning chair Charlie is designed for kids. With its ergonomic shapes, rounded edges and a large seating surface, it is safe for the little ones it is light and stable at once and therefore simple to move for kids and smooth silky surface is pleasant to the touch and easy to clean (32)



Picture (15) Debuted Maison&Objet furniture fair, the collection includes a lightweight chair called Charlie that has rounded legs and edges, and an accompanying table name Luisa

3-2 Recycled material to make Toy furniture

though Recycled material has arrived already with kitchen play units with handles and wheels to make them easy to move also the

brightly colored, recycled plastic is very attractive will not fade in the sun as the plastic is UV protected and do not rot of course On top of that, they are eco-friendly in every way



Picture (16) Outdoor Kitchen Play Cooker Recycled Plastic

so can be left outside in all weather throughout the year, though you can use them indoors too From a purely financial perspective these units are very good value for money, as they will not bring the recurring costs of maintenance, repair and even replacement associated with the wooden versions of this play equipment (34) so that way of production will be a competitive advantage for whom will use it for sustainable development bearing in mind that sustainable

design works through three strategies, which are to preserve natural conditions, the environment, and urban areas (12)

4 Applied Study on toy furniture design

4-1 Zodiac table

This toy designed based on information about the zodiac and the relationship between them consisting of a round table and it revolves around an axis in the middle



Picture (17) zodiac table designed from base and Table Top which round around a middle axis And it can be played in many ways such as scrolling with using the light effects, and when you step, you see which zodiac sign

stops and reads all the information related to it hidden in a small drawer under each one

Another way to play is to choose a zodiac, press its button, and see which one is harmonious or incompatible with others. Also in the middle, we can add a hologram units and when we press the button, zodiac sign will appear in the 3D hologram - A laser beam called a hologram is a spectrum of three-dimensional colors, suggesting to the viewer that the body is actually in the place where this spectrum appears, as if it were a reflection of

reality and tells us about all the information of the zodiac with unlimited data can stored in it with the ability of adding or modifying the data because it, thus achieving a lot of enjoyment and endless diversity of the material presented through the piece of furniture. also the design can be implemented on a square table as well



Picture (18) hologram appear like that on the table when we press the button

4-2 Lego units

The traditional toys shape such as LEGO can be inspired by designing furniture pieces that can be installed, dismantled and changed design based on units that are grouped

together. This is one of the projects that I implemented this project with a group of students in the course that I taught at the MSA University at the academic year 2015-2016



Picture (19) model for Lego units designed as a desk and side table



Picture (20) model for Lego units designed to install and dismantle to form many designs

1-1 Smart table

I designed a smart table equipped with four seats, each of which consists of four different aspects of design to achieve diversity and

difference in their situation during the playing all of this in addition to what the screen of different capabilities and unlimited special, which is connected to Wi-Fi on the Internet



Picture (21) four chair and table with Smart screen



Picture (22) each face of the chair has different design

Results:

1. Toy furniture design concept is an expression to describe the design and use of all or part of furniture piece as a toy, using various materials or technological devices installed in it.
2. the toy furniture design categorized into (toy furniture design with traditional configuration and materials - toy furniture design using digital technology and equipped with technology to display two-dimensional content - toy furniture design equipped with technology to display 3D content such as a hologram)
3. Toy furniture should be made of environmentally friendly materials recyclable especially if the furniture will be available for children use
4. Old toys can be recycled into furniture
5. toy furniture design can developed to design patterns that corresponds to the fields of (entertainment computing, digital entertainment games, entertainment education, and entertainment, exploratory behavior, therapeutic effect ...) which based on the interaction between user and the Piece of furniture
6. toy furniture designs can be applied in some education-entertainment and entertainment technologies which sometimes called "gamification"
7. Toy furniture design can be used as an exploratory tool and learning what happens to express the behavior that is designed to focus on the subtleties of body language and gestures and an extension of simple human behaviors in the use and choice of piece of furniture, its colors and the way to sit on it.
8. The design of toy furniture is used in studying the physical effect of users, especially children, as they found that students who have standing desks are

more attentive than their seated counterparts, and this means reducing childhood obesity and relieving pressure on spinal structures that may occur with traditional offices.

9. Toy furniture design is used as a cognitive intervention where some positive aspects of play can enhance literacy, thinking, reflecting and creativity especially for children. Play promotes early development by at least 33%
10. Games can be beneficial for the growth and functioning of the brain and positive effects of games may also be related to therapeutic interventions that target mental disorders, especially depression, because entertainment relieves stress and is one of the best treatments and distractions to overcome it because mind thinks about other things and releases 'endorphins' hormones. Feeling satisfied, and this is a better way to deal with stress as it gives some time to relax and prepare mind to recover, and the effect of that is more effective if these games or toys are made up of the pieces of furniture or part of them, i.e. toy furniture designs

Recommendations:

It is recommended to

- Recommendation for researchers and academics in scientific colleges to study the principles and foundations of toy furniture design and how to benefit from it in developing a furniture design pattern that corresponds to the fields of (entertainment computing, digital entertainment games, entertainment education, and entertainment, exploratory behavior, therapeutic effect ...) which based on the interaction between the user and Piece of furniture, which will positively affect the economy by attracting new categories of customers
- Activating the role of the state like the Ministry of Education, Ministry of Industry and the Ministry of Planning and institutions in sponsoring of the furniture

design especially which based on using technology like (Edutainment, infotainment ...) Also the furniture design based on recycling materials to strengthen a competitive advantage in this field

- Converting the results to applications by supporting research and development in this field to ensure the development of skills, tools and methodologies which are needed to cooperate between Integrated Sciences in furniture design and manufacturing such as mechanical and electrical Sciences, digital technology, technology of recyclingetc

References

The Arabic References:

(1) سامي محمد محمد عبد العاطي, حنان. "دوافع ممارسة الطفل للألعاب الإلكترونية وانعكاساتها على السلوك الإداري." مجلة بحوث التربية النوعية 2014, no. 36, 227-254. (2014): ص 233

Sami Muhammad Muhammad Abd al-Ati, Hanan. The motives of the child's playing electronic games and their implications for managerial behavior. *Journal of Specific Education Research* 2014, no. 36 (2014): 227-254. pp. 233

(2) رجب عزت, تاريخ الاثاث من اقدم العصور, مطابع الهيئة المصرية العامة للكتاب, 1978, ISBN 977 201 481 5, ص 12

Ragab Ezzat, History of Furniture from the Earliest Times, General Egyptian Book Authority Press, 1978, ISBN 977 201 481 5, p. 12

(3) عباس, رنا فاضل Abbas, Rana Fadhel "الألعاب الإلكترونية وأثرها على مستوى التحصيل الدراسي لدى طلبة المرحلة المتوسطة." *Journal Of Educational and Psychological Researches* 15, no. 59 (2018): 303-329, ص 308

Abbas, Rana Fadhel, Abbas, Rana Fadhel, "Electronic games and their impact on the academic achievement of middle school students." *Journal Of Educational and Psychological Researches* 15, no. 59 (2018): 303-329. P. 308

(4) عزت حسن محمد مرغم, علياء, and علياء. "التعاون بين مصممي الفنون التطبيقية ودوره في تطوير صناعة الأثاث." مجلة بحوث التربية النوعية 2020, no. 58, 455-469. (2020): ص 459

Izzat Hassan Muhammad Margham, Alia, and Alia. "Collaboration between designers of applied arts and its role in developing the furniture industry." *Journal of Specific Education Research* 2020, no. 58 (2020): 455-469, p. 459

(5) عقيب, لراري, فريدة, خيرى. "اثر الالعاب الالكترونية على المراهقين." PhD diss., 2019 ص43

Oaqib, Larry, Farida, Khairy, "The Impact of Electronic Games on Teens." PhD diss., 2019 p.43

The English References:

- (6) Goldstein, J. H. "Applied entertainment: Positive uses of entertainment media." CP Nakatsu R., Rauterberg M.(Ed.), *Handbook of Digital Games and Entertainment Technologies* (2016): 1247-1269.
- (7) Goldstein, Jeffrey. *Play in children's development, health and well-being*. Brussels: Toy Industries of Europe, 2012. P13
- (8) Jordan, Patrick W. *Designing pleasurable products: An introduction to the new human factors*. CRC press, 2002
- (9) Keoleian, Gregory A., and Dan Menerey. "Sustainable development by design: review of life cycle design and related approaches." *Air & Waste* 44, no. 5 (1994): 645-668.
- (10) Ivins, William Mills. *Art & geometry: a study in space intuitions*. Courier Corporation, 1964.p21-23
- (11) Lynn, Greg. "Recycled Toy Furniture-Greg Lynn FORM." *Architectural Design* 79, no. 2 (2009): 94-95. p94
- (12) Lyle, John Tillman. *Regenerative design for sustainable development*. John Wiley & Sons, 1996.p40
- (13) Nakatsu, Ryohei, Matthias Rauterberg, and Paolo Ciancarini, eds. *Handbook of digital games and entertainment technologies*. Springer Singapore, 2017.
- (14) Need, Sociological Human. "Human Behavior and the Interior Environment." P 21
- (15) Palaiologou, Ioanna, ed. *The early years foundation stage: Theory and practice*. Sage, 2016.p330-332
- (16) Piotrowski, Christine M. *Becoming an interior designer: a guide to careers in design*. John Wiley & Sons, 2011.p27
- (17) Postell, Jim. *Furniture design*. John Wiley & Sons, 2012.
- (18) Rauterberg, Matthias. "Positive effects of entertainment technology on human behaviour." In *Building the information society*, pp. 51-58. Springer, Boston, MA, 2004.
- (19) Smardzewski, Jerzy. *Furniture design*. Dordrecht: Springer, 2015.
- (20) Ulrich, Roger S. "Effects of interior design on wellness: Theory and recent scientific research." *Journal of health care interior design* 3, no. 1 (1991): 97-109. P102
- (21) Woolley, Elise M. "Fun: An Exploration in its Relevance to Interaction Design." PhD diss., The Ohio State University, 2010 p4
- (22) Zuhur, Sherifa, ed. *Colors of enchantment: Theater, dance, music, and the visual arts of the Middle East*. American Univ in Cairo Press, 2001.

The Electronic Reference:

- (23) AliExpress retrieved from <https://www.aliexpress.com/i/4000232916837.html?spm=2114.12057483.0.0.29e81694tMdCJp> viewed on 2019
- (24) Amazon , kids car bedroom furniture retrieved from https://www.amazon.com/KidKraft-76040-Race-Car-Toddler/dp/B0047CKEPS/ref=sr_1_4?crd=3CNXLFNG6O6UZ&dchild=1&keywords=kids+car+bedroom+furniture&qid=1612920667&sprefix=cars-bedroom-furniture%2Caps%2C735&sr=8-4 viewed on 2019
- (25) Amazon, ECR4Kids retrieved from <https://www.amazon.com/ECR4Kids->

- Softzone-Wheel-of-Mirrors/dp/B005HUXGCW Viewed on 2019
- (26) Children's factory retrieved from <https://www.childrensfactory.com/shop/toddler-play-center/> Viewed on 2019
- (27) Dezeen ,Natasha Levy 2018 retrieved from https://www.dezeen.com/2018/12/17/zero-space-igarashi-design-studio-tokyo-musashino-art-university/?li_source=LI&li_medium=rhs_block_1 Viewed on 2019
- (28) Dezeen , Eleanor Gibson, 2018 retrieved from https://www.dezeen.com/2018/09/12/we-grow-big-wework-elementary-school-new-york-city/?li_source=LI&li_medium=bottom_block_1 Viewed on 2019
- (29) dezeen, Urban Shapes , Ali Morris, 2018 retrieved from https://www.dezeen.com/2018/09/06/urban-shapes-nortstudio-colourful-geometric-bench/?li_source=LI&li_medium=rhs_block_1 Viewed on 2019
- (30) Dezeen ,Katie de Klee, 2018 retrieved from https://www.dezeen.com/2018/10/08/yuming-hu-chairs-restless-body-singhua-university-furniture-design/?li_source=LI&li_medium=bottom_block_1 Viewed on 2019
- (31) Dezeen, Plastic furniture , Ali Morris 2018 retrieved from <https://www.dezeen.com/2018/01/27/ecobirdy-childrens-furniture-recycled-plastic-circular-economy-maison-objet/> Viewed on 2019
- (32) ecobirdy , shop story retrieved from <https://www.ecobirdy.com/> Viewed on 2019
- (33) Kedeleducation Outdoor Kitchen Play retrieved from <https://www.kedeleducation.co.uk/outdoor-classroom/outdoor-kitchen-play-cooker-oven-unit-double-size-recycled-plastic-hdpe-galt.html> Viewed on 2019
- (34) Kedeleducation , A Portable Children's Double Width Play Kitchen Cooker retrieved from <https://www.kedeleducation.co.uk/outdoor-classroom/outdoor-kitchen-play-cooker-oven-unit-double-size-recycled-plastic-hdpe-galt.html> Viewed on 2019
- (35) kitkraft, Miniature House Furniture Wood Model Kit , retrieved from <https://kitkraft.com/products/miniature-house-furniture-wood-model-kit> viewed on 2019
- (36) NEUROSCIENCE, NEWS APRIL 2015 retrieved from <https://neurosciencenews.com/standing-classroom-engagement-psychology-1993/> Viewed on 2019
- (37) Slideonvenus ,Importance of entertainment ,retrieved from <https://www.slideonvenus.com/importance-of-entertainment/#:~:text=When%20you%20get%20quality%20entertainment,prepare%20your%20mind%20for%20recovery> Viewed on 2019
- (38) Wikipedia, International Federation for Information retrieved from https://en.wikipedia.org/wiki/International_Federation_for_Information_Processing <https://www.ifip.org/homeintro.html> Viewed on 2019
- (39) Wikipedia, Entertainment retrieved from <https://en.wikipedia.org/wiki/Entertainment> Viewed on 2020
- (40) World classroom-furnishing retrieved from <http://www.classroom-furnishing.com/JC-SCHOOL-FURNITURE/BIRCH/birch-3245jcmr-toddler-center-with-mirror.htm> Viewed on 2019
- (41) Youtube , Hologram video 3d 2018 amazing 4k retrieved from <https://www.youtube.com/watch?v=bfy0NyFSygg> Viewed on 2019