Dynamic Understanding of Colors' Combinations and Terminology for Appropriate Effectiveness on Marketing

Seyed Maziar Mohsenian Enghelab-e Eslami Technical College (EITTC), Tehran, Iran

Abstract— For a person who works with color, classic color wheel is an important tool for dynamic understanding (being alive and moving) of color combinations. Knowing terminology of colors helps artist to understand nuance (details) of colors and their slight differences. After drawing attention of customers, its packing and visual condition should be expressed the value of product. For example, if the price of a product is higher than its similar competitor in the market, the color must induct its luxury condition and or when goods are comparatively priced, suitable color can makes stronger effect on customers' mind than similar product. While thousands of products are placed on floors of stores and millions of dollars are considered as reward for customers, intelligently use of color can break maximum selling rate. For appropriate effectiveness on marketing, color of packing should satisfy feeling of achieving to dreams or explain the need that will be targeted by the product.

Index Terms— Color, Lifestyle, Technology, Graphic Design, Color Prediction, Fashion World, Entertainment World, Economic Issues, Social Issues, Rotational Patterns, Varied Patterns, Multi-Dimensional Cultural Compositions, Terminology, Marketing

----- **♦** -----

1 Introduction

Colors always are used in a symbolic approach, whether are directly painted on the sheet or used as cloths on the body of various people to how their social position, ethnicity or country or any other concept [1–11]. Humans always use from color for decoration or describing daily life or other important events [12–15]. Traditionally, color has been an important factor in the case of shopping or trading of goods. Color has not been an accidental issue in most cultures since each color is meaningfully effective [16–22].

Historically, royal family, namely who are in higher position and are considered as special class of society, identified the taste of people [23–26]. Almost all people (who are afforded to use it) were dressed in that form [27, 28]. During Queen Victoria reign, people of high social classes have been very interested to use royal colors and have been imitated this approach in their dresses as high as possible [29–37].

However, there have been still some religious, ethical purity-oriented groups such as Gustav Stickley, who is known as the father of homes of a special social class that warned American society about the furniture as: "Luxury furniture and thousands of other artificial things which are entered to homes as real demand lead to decline of the society." (Gustav and his opinions were not very interested!). Consumer products, especially when they are to be seen in advertisements with combined tonalities! Use a type of applied neutral color [38–43].

*Seyed Maziar Mohsenian, Corresponding Author, B.A. in Graphic Design, Enghelab—e Eslami Technical College (EITTC), Tehran, Iran.

When most people were lived in an environment with low colors, luxury without softness and luxurious colors have been filled the life of rich people and it has been continued at least until collapse and evolutions of 1929 [44–49].

In this section of history, it was demonstrated that lack of color could affected the sensitivity of decade. For example, women of 1930 were inspired from movies to improve their mental level after long time coldness of depression. They were imitated from beautiful actors such as Jean Harlow and used from white, white cream and bright and mellow colors in their dresses! "Interior designers", who are recently grew up like mushrooms, initiated their tendencies using similar colors. Consumer products and propaganda have been the reflection of such bright colors [50–57].

Wild grey, sea blue and military earth colors were governed during World War II. However, when war was over, sad tonalities were used to describe the years of war and disappointment and at the same time, color was evolved! Replacing women by men in industries was led to transforming "beautiful" women of 40s to "housewife" women of 50s! Its result was this sentence: "Pink is suitable for girls, mother always should be in kitchen and father is of the best opinion in home! "The sentence called all women to use pink lipstick, drive pink car and buy pink home appliance. All things which were fashioned as pink color were fashioned in the movie "funny face" of Audrey Hepburn. Barbie doll was born as the symbol of femininity and most women were dressed pink color [58–63].

Tis issue has been interested for social, sexual revolutionaries of 60s and the power of this flowery color was led to uprising. This culture, which evolved with drugs, was led to making more and more transparent and shiny colors. Beatles had two songs about "Yellow submarine" and Peter Max distributed the song "Crazy color". In that time, having a colorful

television was the dream of every housewife [64-69].

When 70s was started, most people have been saturated by colors. Pendulum of time was strike up another time and then, earthy, golden wheat and grey colors became popular. However, the people of that time were afraid from a word: (Avocado) (Avocado green, a green fruit similar to pears). At the end of this decade, spirited colors have been emerged for another time by emerging wild discos and glared with neon and wink lights [70–75].

Color changes were very fast in 80s. By introducing computer and satellite and by beginning of information era, information communication methods became fast and faster. At the start of this decade, American purple was introduced. Medium mellow tones, which were representative of Santafe colors, were used by people around the world who were gradually discovered south west of America and became familiar with colors of desert sunset [76–81].

When numerous overcrowded groups were distributed in the state of Sunbelt, such colors became more interested. In addition, revival of Miami deco architecture led to more attention toward bright colors and Miami Vice TV demonstrated that real men could be wear bright violet [82–91].

At the middle of 80s, however, a new color was named as phenomenon. Black, with its luxurious and trinket beauty, was a strong color and inducted its power [92–97]. The time was the time for freaked and ambitiously demands such as limo or black robe-de-chambres which could be hardly obtained [98–103]. Gradually, black home appliances were introduced to the market and for the first time, foods were packed in black boxes and people were more interested to such important colorful foods and their designers [104–111]. Spirited colors are usually compared with black and at the same time, people proved this opinion with increasingly charging their credit cards to buy these products [112–120].

2 BENEFITS ABOUT COLOR

All slight color shadows are seem to be lighter than dark colors, although it may be possible that all measured identically. The 90s was started with a shock. Economy was downturned and it was the right time to discover the reality. The varied and unstable economy reduced the level of demands so that the demands became simpler and moved toward neutral and safe issues. "In gumboil" was an appropriate term for people who were retreated or disgraced themselves for safety of family and in fact, they were hidden in their gumboils. Continuous downturn. In addition, music markets also were ruined! In this period, a new environmental alarm concerned all people about natural resources and forests. Recycled draft papers were used as alternative for white and shiny papers.

Such a new informed atmosphere was the right time for reviving green by the family of colors which were the symbol of nature. Factories, companies, designers and graphic artists were used the color for their products. In addition to earthy green, other colors such as warm red, golden yellow, clayey and dark brown (which improves by Turkish brown) also were shined.

At the middle of 90s, economy was slightly flourished and utilizing colors were also similarly increased. In this period, the numbers of users of personal computers were increased. Users and designers were linked together through produced electrical colors which were illustrated in monitors of computers and due to increasingly use of computers, they could saw the colors which led to emerging the media and investigated those colors. Movies and TV shows have been previously involved in this story.

By ending this decade and beginning the new century, consumers were excited simultaneously through futures which were passed to maintain the safety. Old attitudes and colors were again emerged and described previous decades. From yoyo to reviving the classic Beetle (a type of Volkswagen). Approximately all people were being stuck in the trap of nostalgia for wearing dresses or home appliances or other consumer products.

Yellow kitchens, white papers and sudden and terrifying return of olive tonalities are currently used as clear green colors in drinks.

In 21th century, consumers are more informed about color and are continuously wanted more color selecting options. Meanwhile, they said welcome to any wise and efficient advice but there is not possible to dictate any option to them.

They understand that colors which are a reflection of their lives help them to find their favorite level of life. They are willing to use from coordinated color groups for creating color combinations in their home, job and dress. It is not important what is the product; however, consumers "should" reacted to various sensational levels of color used in product, advertisements, website, commercial propaganda, packing or in shopping places.

In a world that is progressed to the future by technologies such as E-mail, tendencies and attitudes of humans can be connected to each other by a click on mouse or remote control. Hence, it is necessary for a smart designer or producer to provide an appropriate marketing for consumer product so that it always places on top of tastes, not only in its industry but also in world class. Color is a part (an important part) of this huge image.

Where is the origin of color tastes? If there is a small group who dictate their considered colors to people? How colors reach to public knowledge level and how public tastes become ready for accepting it? Is this a color conspiracy to lead public taste? The issue is very smaller than a conspiracy which determines color assumptions and public opinions. They are color fashion specialists and designers, consultants and dreamer predictors. They are very sensitive to weak points, temporary modes (public caprice) and future events which will affect color tendencies!

They are well informed that how our eyes attract to new things and how is very erratic. A new color, or a color that is used in new combinations, can satisfy our tendency to modernity. Even most traditional tastes also tempted by new colors in packing.

It may be not very new but is a new method of using that color. Inclining a real red toward plummy red and using it in blue, peacock greens as alternative for dark green could be interesting for consumer and it is not important that these eyes are conservatively look at everything!

However, they are taste maker and followers of taste and

mode. They are clients who are not interested for changing norms and always are waiting for others and do not floating themselves into colorful waters.

There are thousands of stories about companies which are not interested for changing their old forms and methods and their number is more than companies that gradually changed their colorful method in their products and logos since they wanted to be stayed in competitive market and illustrated themselves more creative using colors and hence, had more contribution in market.

It doesn't means that they should left success and created new visual business colors to help them by creating real and legal characters, especially in the logos of company and its addresses. The mental effect of colors should be applied in designs without paying attention to tendency to new colors. The current book and the pictured color combinations is a guidance to create various themes which are necessary for establishing a communication with a correct and suitable message.

3 COLOR PREDICTION

Today, it is very easy to study the color tendencies and preferences and to calculate the required time for transforming from industry to another field of activity. Recently, however, the distance between various industries has been increasingly reduced due to fast availability of information and new technologies for creation of color in various applications.

Long production time is very unpleasant in some cases. However, many producers are following focused efforts to increase the rate of evolution of color tastes to high compatibility with, and more use of, new color tastes. While other companies are acted more reasonably.

It should be said in final analysis that any change of color, removing or adding, depend on the nature or image of the product, should be performed based on a reason since there is not any other magical solution!

Color prediction is usually required bravely studies about all cases and issues which are possibly of effects on color tendencies in future. Internet, various periodicals and TV programs, which are about tendencies, commercial exhibitions and color prediction institutes, are great resources for collecting information related to tastes and tendencies of audiences. Simultaneous with fast accessibility to information, products that definitely have change in color are limited only due to inevitable time required for research, development and production.

4 FASHION WORLD

The colors that are seen in fashion world find their way toward consumer products and affect the type of design. This is the first place that should be searched for finding arrow head of color. Inevitably, this question is asked that where places are searching by fashion and fashion world to find tendency? Fashion designers are frequently found their tendencies in such books or it may be possible that they follow their fantasy images which are resulted from a strange journey. These designers may have seen a fabric in an exhibition and may be wanted to use these ideas in completely new color genres. Some people are believed that designers and producers of fabric are main audiences, especially when are cooperated with talented designers to develop new color forms. Sometime, the belief was that all strong effects are originated from fashion design institutes and then are declined to lower levels. However, during 60s, when young people were invented their new color forms and combinations, this issue was changed. Form and color of fashion can originate from street fashions and go forward to high level fashions. For example, when young people start shopping from second hand markets to new products or fashions, designers interest to this issue and use their color and forms in their fashions. It means that they consider old–fashioned designs in their products.

5 ENTERTAINMENT WORLD

Music world is very effective similar to the space and themes of movies and popular TV shows, especially those which are under production. Media world, especially those which are focused on entertainment, frequently show the photos of superstars and scenes of them in which there are some issues about future colors and they talk about their future programs. Such information may be seen in channel, simultaneously. Paying attention to the color of clothes used by superstars or people who are seen in these scenes is very important, especially when they are performing in the show since in that time; they are most appropriate fashion models. The most interesting sport activity and the color-shirt of favorite teams also could be an inspirational source for color tendencies.

Museums, especially those which are planned to have a world journey (mobile museums), have frequently some programs before public show for their exhibitions. When a specific artists such as Guffin introduces an artwork, bright tropical colors inspire many regions of designing or when King Tut shows its method in the world and become interesting for numerous people, an excessive tendency toward shiny golden metallic colors forms in the worlds of fashion, interior design and publishing.

6 ECONOMIC ISSUES

It may be hard to imagine that in spite of ignoring economic considerations in designing the color, this is historically one of the most effective fields relating to the color. Economic conditions can certainly affect, mentally, practical aspects of spending in various products.

When economy is in turndown condition, people are not ready for using colors and hence, they use from neutral colors. When people are optimist, they have more tendencies to select a new option with alive and happy color. This is one of the most skilfully fields of color recognition and most colors form based on hopefully thoughts not realities!

7 SOCIAL ISSUES

It is obvious that during war or peacefully activities, numerous colors emerge related to these events. For example, military green and brown are the colors of flags during national revolutions or during ceremonies such as century ceremony, American Cup, Olympic or any important politic event such as presidential election, some other colors suddenly become popular. A social issue aware people to use a special family of colors. In 60s, Rachel Carson was represented the first serious opinion about the environmental issues of society in her book named as Silent Spring. The book was her encouraging voice. This color which was dependent on earthy tonalities and especially green avocado were gradually become popular during that decade. After that, during 90s, earthy tones have been used as a result of various tastes and in relation with environment and its protecting.

8 ROTATIONAL AND VARIED PATTERNS

All tendencies and attitudes move in a circular or wavy pattern and show a natural circle of low and high popularity. For example, at the beginning of 80s, strong tendency toward violet, grey and blue-grey was an alternative for earthy tonalities which were more popular than other colors in interior design and consumer products.

As it is frequent, supplementary colors of color circle are often (not always) used to induct the feeling of being new. This issue was important when excessive use of green avocado and earthy tonalities were so popular that most consumers were got sick by seeing these colors.

They were not interested to see another wheat golden colored fluffy carpet, anymore. Therefore, carpets and other consumer products were changed to mauve (violet-purple).

A long time was required for this color to become popular and boring. The best way to overcome this is combining the color in a new inventive set of colors. Only when a color revives in a new set, it will not be old-fashioned. If mauve violet correctly affects the mentality of a set, it should not be completely ignored since it is not similar to the current taste and in addition, it should not be excessively used in new combinations of colors.

9 LIFESTYLE

Smart people can collect correct information from publications about popular jobs or various lifestyles. Which are the favorite entertainment forms and how wear people when are involved in such activities? Is it possible to emphasize on sport colors with high energy which lead to secretion of adrenaline? Are people feeling easier by using natural colors, which are the symbols of nature and seems to be completely non-artificial? Are people interested to work in their homes and to wear their convenient grey jacket or to wear other convenient clothes such as jean or cotton? This is highly related to the fashion world but it should be kept in mind that these issues affect sometimes on the color of other consumer products.

10 MULTI-DIMENSIONAL CULTURAL COMPOSITIONS

United States is always a huge set of various ethnicities with their specific taste, values, clothes and culture. A high concentration of various ethnicities are presented in various regions of United States that their color cultures are originated from their traditions. For example, south west of America, with huge number of Latin people, is a thriving market for salsa and red chili pepper. This is a good example of international variation of population and immigration wave that eventually bring new color effects for people in a widely manner.

Increase in international travels and fast communications using satellite and internet allow people to experience various colors and compositions from different nations. The upcoming challenge is about places that are the origins of new inspirations. It should be noted that color limitation is rapidly eliminating in various geographical regions and its reasons are wide distribution, shopping orders through internet and its contribution to wide circle of market in the world.

11 CONCLUSION

Technology brings some progresses about designing and color. Standing on the peak of new technologies in creation of color and the modality of the effects of color groups are very important. For instance, various metallic colors, which are differed from their original bright theme, or new shiny colors and oil colors or special pearlescent and iridescent colors affect the available colors in the market and industrial colors required in plastic, fabric, cosmetics a publishing industries and provide a new world of new color capabilities for us. Using hexa–chrome publishing system with six colors is definitely an appropriate example of effects of publishing process on producing new colors.

REFERENCES

[1] S.M. Goldwasser, R.A. Reynolds, Real-time display and manipulation of 3-D medical objects: The voxel processor architecture, Computer Vision, Graphics, and Image Processing, Volume 39, Issue 1, July 1987, Pages 1-27.

[2] Edmund Burger, Geomorphic architecture: Multifamily residential design solutions, Tunnelling and Underground Space Technology, Volume 2, Issue 3, 1987, Pages 287-297.

[3] Paolo d'Alessandro, Manuela Dalla Mora, Elena De Santis, Issues in design and architecture of advanced dynamic model management for decision support systems, Decision Support Systems, Volume 5, Issue 4, December 1989, Pages 365-377.
[4] DeLosF. DeTar, FORTRAN and the Art of PC Programming: By Tim Ward and Eddie Bromhead, Wiley, Chichester, U.K., 1989. £16.95., Computers & Chemistry, Volume 14, Issue 3, 1990, Pages 259-260.

[5] Martin Molina, Victor Flores, Generating multimedia presentations that summarize the behavior of dynamic systems using a model-based approach, Expert Systems with Applications, Volume 39, Issue 3, 15 February 2012, Pages 2759-2770.

[6] L. Casalegno, J. Cuperus, A. Daneels, Ch. Serre, C.H. Sicard and P. Skarek, DISTRIBUTED APPLICATION SOFTWARE ARCHITECTURE APPLIED TO THE LEP PREINJECTOR CONTROLS, In IFAC Workshop Series, edited by M.G. RoddK.D. Müller, Pergamon, Oxford, 1987, Pages 143-149.

[7] D. Catley, E. Lehmann, N. Maniar, B. Baret, Y. Homma, W. Trafalski, Design optimization: A state-of-the-art review, Marine Structures, Volume 3, Issue 5, 1990, Pages 343-390.

[8] Patricia K. Nguyen, Juan Santos, Greig Scott, Jan Engvall, Graham Wright, Michael McConnell, Craig Meyer, Dwight Nishimura, John Pauly, Bob Hu, Phillip C. Yang, Adaptive real-time architecture in magnetic resonance coronary angiography: Clinical study, Journal of the American College of Cardiology, Volume 41, Issue 6, Supplement 2, 19 March 2003, Pages 468-469.

- [9] Dorothea Papathanassiou-Zuhrt, Cognitive Load Management of Cultural Heritage Information: An Application Multi-Mix for Recreational Learners, Procedia Social and Behavioral Sciences, Volume 188, 14 May 2015, Pages 57-73.
- [10] G Pelosi, G. Saviozzi, M.G. Trivella, A. L'Abbate, Small artery occlusion: A theoretical approach to the definition of coronary architecture and resistance by a branching tree model, Microvascular Research, Volume 34, Issue 3, November 1987, Pages 318-335.
- [11] A. Kaufman, R. Bakalash, Memory and processing architecture for 3D voxel-based imagery: IEEE Comput. Graph. Appl. Vol 8 No 6 (1988) pp 10–23, Computer-Aided Design, Volume 21, Issue 3, April 1989, Page 185.
- [12] LE CORBUSIER, ARCHITECTURE, In Towards a New Architecture, edited by LE CORBUSIER, Butterworth-Heinemann, 1989, Pages 149, 151.
- [13] L. Feng, Rule-based art pattern CAD: Comput. Graph. Vol 12 No 3/4 (1988) pp 323–327, Computer-Aided Design, Volume 21, Issue 3, April 1989, Page 185.
- [14] R. Bisiani, F. Alleva, A. Forin, R. Lerner and M. Bauer, Chapter 4 The Architecture of the Agora Environment, In Distributed Artificial Intelligence, edited by Michael N Huhns, Morgan Kaufmann, San Francisco, 1987, Pages 99-117.
- [15] Arthur H. Robinson, CARTOGRAPHY AS AN ART, In International Cartographic Association, edited by D.W. RHINDD.R.F. TAYLOR, Pergamon, Amsterdam, 1989, Pages 91-102.
- [16] Bec Paton, Kees Dorst, Briefing and reframing: A situated practice, Design Studies, Volume 32, Issue 6, November 2011, Pages 573-587.
- [17] L.M. Camarinha-Matos, Plan generation in robotics: State of the art and perspectives, Robotics, Volume 3, Issues 3–4, September–December 1987, Pages 291-328.
- [18] Perry E. Borchers, Applying Photogrammetry to the Protection of Historic Architecture and Museum Collections from Earthquakes and Other Natural Disasters, In Protecting Historic Architecture and Museum Collections from Natural Disasters, edited by Barclay G. Jones, Butterworth-Heinemann, 1986, Pages 251-265. [19] Norio Okino, H. Takeyama, O/O (Object and Operation) Dualism for CAD/CAM Software Architecture, CIRP Annals Manufacturing Technology, Volume 34, Issue 1, 1985, Pages 179-182.
- [20] Filomena Sica, Andrea Pica, Antonello Merlino, Irene Russo Krauss, Carmine Ercole, Delia Picone, The multiple forms of bovine seminal ribonuclease: Structure and stability of a C-terminal swapped dimer, FEBS Letters, Volume 587, Issue 23, 29 November 2013, Pages 3755-3762.
- [21] W. Tenten, L. Fuss, W. Hoge, H. Huppertz, H. Keuchen, W. Koudelka, J. Lerch, K.D. Müller, P. Reinhart, F. Rongen and B. Görg, DISTRIBUTED INTELLIGENCE IN A LAN ARCHITECTURE INCREASES THE FLEXIBILITY IN CONTROL SYSTEMS FOR FUSION EXPERIMENTS, In Fusion Technology 1986, Pergamon, 1986, Pages 1427-1432.
- [22] R. Coyne, The art of computer graphics programming: Mitchell, W J, Liggett, R S and Kvan, T Van Nostrand Reinhold (1987) 572 pp, Computer-Aided Design, Volume 20, Issue 4, May 1988, Pages 223-224.
- [23] W. Ray Crozier, Antony J. Chapman, The Perception of Art: The Cognitive Approach and Its Context, In: W. Ray Crozier and Antlony J. Chapman, Editor(s), Advances in Psychology, North-Holland, 1984, Volume 19, Pages 3-23.
- [24] Victoria L. McGuffin, Peiru Wu, Three-dimensional molecular simulation of chromatographic separations, Journal of Chromatography A, Volume 722, Issues 1–2, 26 January 1996, Pages 3-17.
- [25] Maralynn Hagood Slegelis, A study of Jung's Mandala and its relationship to art psychotherapy, The Arts in Psychotherapy, Volume 14, Issue 4, Winter 1987, Pages 301-311.
- [26] Sergio Brofferio, A modular architecture for adaptive predictive coders of digital television signals, Microprocessing and Microprogramming, Volume 15, Issue 3, March 1985, Pages 141-151.
- [27] F. Bolck, Visual Technology and Art). Proceedings of Computer Graphics Tokyo '85Computer Graphics, T.L. Kunii (Ed.). Springer-Verlag, Berlin-Heidelberg-New York-Tokyo (1985), ISBN: 3-540-70009-9, Experimental pathology, Volume 31,

- Issue 4, 1987, Page 242.
- [28] Patrick R. Chai, Alan W. Wilhite, Cryogenic thermal system analysis for orbital propellant depot, Acta Astronautica, Volume 102, September-October 2014, Pages 35-46.
- [29] Olgierd Czerner, The Museum of Architecture in Wrocław, International Journal of Museum Management and Curatorship, Volume 5, Issue 2, June 1986, Pages 127-138.
- [30] John Lansdown, Tom Maver, CAD in architecture and building, Computer-Aided Design, Volume 16, Issue 3, May 1984, Pages 148-154.
- [31] Olivier Corby, Blackboard architectures in computer aided engineering, Artificial Intelligence in Engineering, Volume 1, Issue 2, October 1986, Pages 95-98.
- [32] Květoslav Chvatík, Semiotics of the Literary Work of Art, Russian Literature, Volume 20, Issue 4, 15 November 1986, Pages 297-322.
- [33] S.L. Hurst, VLSI Architecture, B. Randell, P.C. Treleaven (Eds.). Prentice Hall International (1983), Microelectronics Journal, Volume 17, Issue 2, March-April 1986, Page 37.
- [34] Jerome R. Cox Jr., Cees Zeelenberg, Computer technology: State of the art and future trends, Journal of the American College of Cardiology, Volume 9, Issue 1, January 1987, Pages 204-214.
- [35] Clemens von Birgelen, Robert Gil, Peter Ruygrok, Francesco Prati, Carlo Di Mario, Wim J. van der Giessen, Pim J. de Feyter, Patrick W. Serruys, Optimized expansion of the Wallstent compared with the Palmaz-Schatz stent: On-line observations with two- and three-dimensional intracoronary ultrasound after angiographic guidance, American Heart Journal, Volume 131, Issue 6, June 1996, Pages 1067-1075.
- [36] J. Vlietstra, ARCADE An architecture for CAD in electronics, Computers in Industry, Volume 5, Issue 1, March 1984, Pages 3-20.
- [37] Nenad Marovac, Architecture of application-oriented systems using interactive computer graphics, Computers & Graphics, Volume 10, Issue 4, 1986, Pages 371-377
- [38] D.G. Dimmler, A MEMORY INTENSIVE FUNCTIONAL ARCHITECTURE FOR DISTRIBUTED COMPUTER CONTROL SYSTEMS*, In Distributed Computer Control Systems 1982, edited by R.W. GELLIER.-R. TAVAST, Pergamon, 1983, Pages 59-71.
- [39] J.F. Nunamaker, B.R. Konsynski, Productivity tools in the development and transfer of computer applications: State of the art and practice, Computers, Environment and Urban Systems, Volume 11, Issues 1–2, 1986, Pages 51-64.
- [40] J. Hatvany, CAD State of the art and a tentative forecast, Robotics and Computer-Integrated Manufacturing, Volume 1, Issue 1, 1984, Pages 61-64.
- [41] Yehuda E. Kalay, Redefining the role of computers in architecture: from drafting/modelling tools to knowledge-based design assistants, Computer-Aided Design, Volume 17, Issue 7, September 1985, Pages 319-328.
- [42] Patrick Purcell, Computer education in architecture, Computer-Aided Design, Volume 12, Issue 5, September 1980, Pages 239-251.
- [43] Simon L. Goodman, The cytoskeleton: Cellular architecture and choreography: by Alice B. Fulton, Chapman and Hall, 1984. (80 pages) ISBN 0412255103, Trends in Biochemical Sciences, Volume 10, Issue 1, January 1985, Page 39.
- [44] Alexander R. Cuthbert, Architecture, society and space—the high-density question re-examined, Progress in Planning, Volume 24, Part 2, 1985, Pages 71-160.
- [45] Roberto Raieli, 4 MIR's methodology in the context of LIS, In Chandos Information Professional Series, edited by Roberto Raieli, Chandos Publishing, 2013, Pages 89-132.
- [46] Ken SAKAMURA, Akira SEKINO, Toshihiko KODAKA, Takao UEHARA and Hideo AISO, VLSI AND SYSTEM ARCHITECTURE THE NEW DEVELOPMENT OF SYSTEM 5G, In Fifth Generation Computer Systems, edited by T. MOTO-OKA, Elsevier, Amsterdam, 1982, Pages 189-208.
- [47] Asuman Aypek Arslan, An Analysis of Teaching Methods Used at the Course of Basic Design, Procedia Social and Behavioral Sciences, Volume 51, 2012, Pages 172-176.

- [48] Alan S. Michaels, Stephen L. Matson, Membranes in biotechnology: State of the art, Desalination, Volume 53, Issues 1–3, 1985, Pages 231-258.
- [49] S. LOS, PASSIVE SOLAR SYSTEMS VERSUS ARCHITECTURE, In Passive and Low Energy Architecture, edited by Simos Yannas, Pergamon, 1983, Pages 837-842.
- [50] Manuela Ruiz-Montiel, María-Victoria Belmonte, Javier Boned, Lawrence Mandow, Eva Millán, Ana Reyes Badillo, José-Luis Pérez-de-la-Cruz, Layered shape grammars, Computer-Aided Design, Volume 56, November 2014, Pages 104-119.
- [51] P Verebély, GD80—A multi-microprocessor architecture for computer graphics, Euromicro Newsletter, Volume 6, Issue 6, November 1980, Pages 406-409. [52] Tao Mei, Minzhou Luo, Xiaodong Ye, Jun Cheng, Lan Wang, Bin Kong and Rujin Wang, Chapter 2.4 Design and Implementation of a Service Robot for Elders, In Household Service Robotics, edited by Yangsheng XuHuihuan QianXinyu Wu, Academic Press, Oxford, 2015, Pages 83-93.
- [53] Hui-Lan H. Titangos, 5 Santa Cruz Public Library: community on the web, In Chandos Publishing Social Media Series, edited by Hui-Lan H. Titangos, Chandos Publishing, 2013, Pages 51-79.
- [54] A.D. Bell, D. Roberts, A. Smith, Branching patterns: the simulation of plant architecture, Journal of Theoretical Biology, Volume 81, Issue 2, 21 November 1979, Pages 351-375.
- [55] Ben Lugtenberg, Loek Van Alphen, Molecular architecture and functioning of the outer membrane of Escherichia coli and other gram-negative bacteria, Biochimica et Biophysica Acta (BBA) Reviews on Biomembranes, Volume 737, Issue 1, 21 March 1983, Pages 51-115.
- [56] Lubna Almenoar, Procedure with graphics using Quranic verses in English, Procedia - Social and Behavioral Sciences, Volume 9, 2010, Pages 1101-1119.
- [57] Irving Lavin, Bernini and the art of social satire, History of European Ideas, Volume 4, Issue 4, 1983, Pages 365-420.
- [58] P. Purcell, Computing and architecture: a fresh conspectus, Computer-Aided Design, Volume 10, Issue 4, July 1978, Pages 223-225.
- [59] Eugenio Frixione, Chapter 5 Neura, nerves, nerve fibers, neurofibrils, microtubules: Multidimensional routes of pain, pleasure, and voluntary action in images across the ages, In: Stanley Finger, Dahlia W. Zaidel, François Boller and Julien Bogousslavsky, Editor(s), Progress in Brain Research, Elsevier, 2013, Volume 203, Pages 115-160.
- [60] Louis Weitzman, Chapter 14 DESIGNER: A KNOWLEDGE-BASED GRAPHIC DESIGN ASSISTANT, In Artificial Intelligence in Engineering Design, edited by CHRISTOPHER TONGDUVVURU SRIRAM, Academic Press, Boston, 1992, Pages 433-466.
- [61] Roy Harris, Signs, symbols and architecture: Geoffrey Broadbent, Richard Bunt and Charles Jencks (eds) John Wiley and Sons, Chichester, UK (1980) viii + 446 pp, Design Studies, Volume 2, Issue 2, April 1981, Pages 122-123.
- [62] Robert W. Huff, John M. Dawson and G.J. Culler, Computer Modeling in Plasma Physics on the Parallel-Architecture CHI Computer, In Parallel Computations, edited by GARRY RODRIGUE, Academic Press, 1982, Pages 365-396.
- [63] Patrick Purcell, Architecture and the microprocessor: John Paterson John Wiley, UK (1980) 229 pp, £13.80, Design Studies, Volume 2, Issue 1, January 1981, Pages 55-56.
- [64] Edward H. Teague, A survey of architecture magazines, Serials Review, Volume 7, Issue 2, April–June 1981, Pages 9-35.
- [65] Mohammadjavad Mahdavinejad, Raha Bahtooei, Seyyed Mohammadmahdi Hosseinikia, Mahsa Bagheri, Ayoob Aliniaye Motlagh, Fatemeh Farhat, Aesthetics and Architectural Education and Learning Process, Procedia Social and Behavioral Sciences, Volume 116, 21 February 2014, Pages 4443-4448.
- [66] Lauretta Bender, The creative process in psychopathological art, The Arts in Psychotherapy, Volume 8, Issue 1, 1981, Pages 3-14.
- [67] Eleanor Mathews, "when tillage begins, other arts follow ..." A core list of agriculture serials, Serials Review, Volume 7, Issue 3, July–September 1981, Pages 9-

- 33, 35, 37, 39-50.
- [68] Lech Jóźwiak, Yahya Jan, Design of massively parallel hardware multi-processors for highly-demanding embedded applications, Microprocessors and Microsystems, Volume 37, Issue 8, Part D, November 2013, Pages 1155-1172.
- [69] Bill Chaitkin, Einstein and architecture, In Einstein: the First Hundred Years, edited by Maurice Goldsmith, Alan Mackay and James Woudhuysen, Pergamon, 1980, Pages 131-144.
- [70] John Smith, Morality and architecture: David Watkins, Clarendon Press, Oxford (1977) 115, Design Studies, Volume 1, Issue 2, October 1979, Page 128.
- [71] Bradley H. Strauss, Victor A. Umans, Robert-Jan van Suylen, Pim J. de Feyter, Jean Marco, Gregory C. Robertson, Jean Renkin, Guy Heyndrickx, Vojislav D. Vuzevski, Fred T. Bosman, Patrick W. Serruys, Directional atherectomy for treatment of restenosis within coronary stents: Clinical, angiographic and histologic results, Journal of the American College of Cardiology, Volume 20, Issue 7, December 1992, Pages 1465-1473.
- [72] Nicholas Negroponte, The architecture machine, Computer-Aided Design, Volume 7, Issue 3, July 1975, Pages 190-195.
- [73] LIONEL MADDEN, CHAPTER 10 The Visual Arts, In How to Find Out About the Victorian Period, edited by LIONEL MADDEN, Pergamon, 1970, Pages 100-121.
- [74] KRISTINA HOOPER, Chapter 8 PERCEPTUAL ASPECTS OF ARCHITECTURE, In Perceptual Ecology, edited by Edward C. Carterette and Morton P. Friedman, Academic Press, 1978, Pages 155-189.
- [75] Marilyn Wolf, Chapter 7 System-Level Design and Hardware/Software Codesign, In High-Performance Embedded Computing (Second Edition), edited by Marilyn Wolf, Morgan Kaufmann, Boston, 2014, Pages 341-38.
- [76] Hyun-Su Kim, Jinkoo Kim, Da-Woon An, Development of integrated system for progressive collapse analysis of building structures considering dynamic effects, Advances in Engineering Software, Volume 40, Issue 1, January 2009, Pages 1-8.
- [77] JULIAN HOCHBERG, Chapter 10 ART AND PERCEPTION*, In Perceptual Ecology, edited by Edward C. Carterette and Morton P. Friedman, Academic Press, 1978, Pages 225-258.
- [78] Richard Langendorf, Problems: Solutions. Visual thinking for graphic communication: Wilde, R. (1989). New York, NY: Van Nostrand-Reinhold Co., Computers, Environment and Urban Systems, Volume 15, Issues 1–2, 1991, Page 87.
- [79] Jean-Pierre Belaud, Stéphane Negny, Fabrice Dupros, David Michéa, Benoît Vautrin, Collaborative simulation and scientific big data analysis: Illustration for sustainability in natural hazards management and chemical process engineering, Computers in Industry, Volume 65, Issue 3, April 2014, Pages 521-535.
- [80] Deirdre C. Stam, Library trends: Intellectual access to graphic information: M. Rorvig (Issue Ed.) (Spring 1990, 38(4)). University of Illinois, Urbana (1990), Information Processing & Management, Volume 27, Issue 6, 1991, Pages 726-731.
- [81] C.M. Eastman, Through the looking glass: why no wonderland: Computer applications to architecture in the USA, Computer-Aided Design, Volume 6, Issue 3, July 1974, Pages 119-124.
- [82] Fan Dai, Integrated planning of robotic applications in a graphic-interactive environment, Robotics and Autonomous Systems, Volume 8, Issue 4, 1991, Pages 311-322.
- [83] Dorothea Papathanasiou-Zuhrt, Daniel Fernando Weiss-Ibáñez, Cognitive Processing of Information with Visitor Value in Cultural Heritage Environments. The Case of the SEE TCP SAGITTARIUS 2011–2014, Procedia Economics and Finance, Volume 15, 2014, Pages 303-311.
- [84] William J. Mitchell, Techniques of automated design in architecture: A survey and evaluation, Computers & Urban Society, Volume 1, Issue 1, January 1975, Pages 49-76.
- [85] Robert J. Isaacson, Richard L. Christiansen, Carla A. Evans, Richard A. Riedel, Research on variation in dental occlusion: A "state of the art" workshop conducted by the Craniofacial Anomalies Program, the National Institute of Dental Research, American Journal of Orthodontics, Volume 68, Issue 3, September 1975, Pages 241-

255

[86] Timothy A. Sanborn, James E. Tcheng, H. Vernon Anderson, Charles E. Chambers, Sharon L. Cheatham, Matthew V. DeCaro, Jeremy C. Durack, Allen D. Everett, John B. Gordon, William E. Hammond, Ziyad M. Hijazi, Vikram S. Kashyap, Merrill Knudtson, Michael J. Landzberg, Marco A. Martinez-Rios, Lisa A. Riggs, Kui Hian Sim, David J. Slotwiner, Harry Solomon, Wilson Y. Szeto, Bonnie H. Weiner, William S. Weintraub, John R. Windle, ACC/AHA/SCAI 2014 Health Policy Statement on Structured Reporting for the Cardiac Catheterization Laboratory: A Report of the American College of Cardiology Clinical Quality Committee, Journal of the American College of Cardiology, Volume 63, Issue 23, 17 June 2014, Pages 2591-2623.

[87] Dilek Akbulut, The effects of different student backgrounds in basic design education, Procedia - Social and Behavioral Sciences, Volume 2, Issue 2, 2010, Pages 5331-5338

[88] I. Herman, Architectural applications for logic modelling: Tutorial: Computer graphic hardware, image generation and displayK H Reghbati and A Y C Lee Computer Society Press, Washington, DC, USA (1988) 375, Computer-Aided Design, Volume 21, Issue 10, December 1989, Page 660.

[89] Jose Antonio Lozano-Galant, Ignacio Payá-Zaforteza, Structural analysis of Eduardo Torroja's Frontón de Recoletos' roof, Engineering Structures, Volume 33, Issue 3, March 2011, Pages 843-854.

[90] NEVILLE CARRICK, Chapter Twelve - Art History: Special Periods: Dewey Class 709, In How to Find Out About the Arts, edited by NEVILLE CARRICK, Pergamon, 1965, Pages 83-88.

[91] Chi Dung Tran, Houcine Ezzedine, Christophe Kolski, ElSEval, a generic reconfigurable environment for evaluating agent-based interactive systems, International Journal of Human-Computer Studies, Volume 71, Issue 6, June 2013, Pages 725-761.

[92] NEVILLE CARRICK, Chapter Thirteen - Art History: National: Dewey Class 709, In How to Find Out About the Arts, edited by NEVILLE CARRICK, Pergamon, 1965, Pages 89-98.

[93] A.J. PETERS, CHAPTER 8 - EDUCATION FOR THE ARTS, In British Further Education, edited by A.J. PETERS, Pergamon, 1967, Pages 159-168.

[94] GORDON SUTTON, CHAPTER XIII - Art in Secondary Schools, In Artisan Or Artist?, edited by GORDON SUTTON, Pergamon, 1967, Pages 229-240.

[95] A. TRUMAN SCHWARTZ, 7 - The architecture of an atom, In Chemistry, edited by A. TRUMAN SCHWARTZ, Academic Press, 1973, Pages 149-184.

[96] José Luis Lerma, Santiago Navarro, Miriam Cabrelles, Valentín Villaverde, Terrestrial laser scanning and close range photogrammetry for 3D archaeological documentation: the Upper Palaeolithic Cave of Parpalló as a case study, Journal of Archaeological Science, Volume 37, Issue 3, March 2010, Pages 499-507.

[97] Conrad Boton, Sylvain Kubicki, Gilles Halin, Designing adapted visualization for collaborative 4D applications, Automation in Construction, Volume 36, December 2013, Pages 152-167.

[98] Robert Michael Brain, The pulse of modernism: experimental physiology and aesthetic avant-gardes circa 1900, Studies in History and Philosophy of Science Part A, Volume 39, Issue 3, September 2008, Pages 393-417.

[99] Anca Mitrache, Branding and Marketing - An Architect's Perspective, Procedia - Social and Behavioral Sciences, Volume 62, 24 October 2012, Pages 932-936.

[100] PAMELA RYDZEWSKI, CHAPTER 6 - Egyptian Art, In The Commonwealth and International Library: Liberal Studies Division, edited by PAMELA RYDZEWSKI, Pergamon, 1967, Pages 66-83.

[101] Nangkula Utaberta, Badiossadat Hassanpour, Aligning Assessment with Learning Outcomes, Procedia - Social and Behavioral Sciences, Volume 60, 17 October 2012, Pages 228-235.

[102] Heinz Kossmann, A graphic SDL support environment, Computer Networks and ISDN Systems, Volume 13, Issue 2, 1987, Pages 91-96.

[103] A. Hobson-Frohock, Quantitative analysis using chromatographic techniques: Edited by E. Katz. Pp. 427. Wiley, Chichester, 1987. £37.50, Endeavour, Volume 11,

Issue 3, 1987, Page 163.

[104] Xiangyu Wang, Mi Jeong Kim, Peter E.D. Love, Shih-Chung Kang, Augmented Reality in built environment: Classification and implications for future research, Automation in Construction, Volume 32, July 2013, Pages 1-13.

[105] Pablo García-Sánchez, Jesús González, Antonio M. Mora, Alberto Prieto, Deploying intelligent e-health services in a mobile gateway, Expert Systems with Applications, Volume 40, Issue 4, March 2013, Pages 1231-1239.

[106] Sheraz Ahmed, Markus Weber, Marcus Liwicki, Christoph Langenhan, Andreas Dengel, Frank Petzold, Automatic analysis and sketch-based retrieval of architectural floor plans, Pattern Recognition Letters, Volume 35, 1 January 2014, Pages 91-100.

[107] Marina Fridin, Storytelling by a kindergarten social assistive robot: A tool for constructive learning in preschool education, Computers & Education, Volume 70, January 2014, Pages 53-64.

[108] Silvio Carta, The image of the Shanghai 2010 Expo the contribution of single pavilions to Shanghai's global image, Frontiers of Architectural Research, Volume 2, Issue 4, December 2013, Pages 387-399.

[109] Sasipan Srivilailuck, Patrick Beale, Iain Murray, Brian Kidd, Hidden design: An inquiry into the design of inclusive building environments and digital interface design for the vision impaired, International Congress Series, Volume 1282, September 2005, Pages 1071-1074.

[110] Atsushi Mizuno, Ken Mano, Yoshinobu Kawabe, Hiroaki Kuwabara, Kiyoshi Agusa, Shoji Yuen, Name-passing style GUI programming in the rr-calculus-based language Nepi, Electronic Notes in Theoretical Computer Science, Volume 139, Issue 1,4 November 2005, Pages 145-168.

[111] Georgică Mitrache, Sustainable Management in Academic Architectural Research, Procedia - Social and Behavioral Sciences, Volume 62, 24 October 2012, Pages 937-941.

[112] Joseph Kwan, A Graphic Survey of Perception and Behavior for the Design Profession, Forrest Wilson. Van Nostrand Reinhold Company, Birmingham, U.K. (1984), Journal of Environmental Psychology, Volume 5, Issue 2, June 1985, Pages 215-219.

[113] W.G.V. Balchin, Mapping information: The graphic display of quantitative information: Howard T. Fisher Abt Books, Cambridge, MA, USA, 384 pp, Land Use Policy, Volume 2, Issue 3, July 1985, Pages 251-252.

[114] Dania González Couret, Chapter 8 - Minimum Energy Housing in Cuba, In Sustainability, Energy and Architecture, edited by Ali Sayigh, Academic Press, Boston, 2013, Pages 195-226.

[115] Birgit Meyer, David Morgan, Crispin Paine, S. Brent Plate, The origin and mission of Material Religion, Religion, Volume 40, Issue 3, July 2010, Pages 207-211.

[116] Manuel Miró, Elo Harald Hansen, Solid reactors in sequential injection analysis: recent trends in the environmental field, TrAC Trends in Analytical Chemistry, Volume 25, Issue 3, March 2006, Pages 267-281.

[117] Tiziana Cardinale, Domenico Colapietro, Nicola Cardinale, Fabio Fatiguso, Evaluation of the Efficacy of Traditional Recovery Interventions in Historical Buildings. A New Selection Methodology, Energy Procedia, Volume 40, 2013, Pages 515-524.

[118] Hau T. Ngo, Robert W. Ives, Ryan N. Rakvic, Randy P. Broussard, Real-time video surveillance on an embedded, programmable platform, Microprocessors and Microsystems, Volume 37, Issues 6–7, August–October 2013, Pages 562-571.

[119] Michael D. Fowler, Soundscape as a design strategy for landscape architectural praxis, Design Studies, Volume 34, Issue 1, January 2013, Pages 111-128.

[120] Alexei V. Samsonovich, On a roadmap for the BICA Challenge, Biologically Inspired Cognitive Architectures, Volume 1, July 2012, Pages 100-107.