

## **Changing of the Visual Identity Design in the Dynamic Logo**

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### **Research Summary**

The world in which we live has become very fast and constantly changing and producing new forms of communication, development, and information technology, and this was the result of the digital revolution and also changed the current global scene politically, economically and socially. Since humans live in the current world of technology, the identity must be dynamic to adapt to the environment. And to depend on change and know that change is part of the reality of its own business and must work on the basis that they are living organisms dependent on change, for it is not something fixed, static and fossilized, but it is constantly evolving. We must move from simple static identities to dynamic, highly interactive variable identities.

### **Research problem**

The research problem lies in several questions:

- What is the importance of developing new design methods to conform to contemporary concepts?
- Were mathematical averages and algorithms effective in producing a second dimension of designs as well as a structural and organizational system with a high degree of complexity, efficiency and beauty?

- How do flexible design systems transform identity into a dynamic visual identity?

## **Research Importance**

The importance of the research is due to the fact that the development of an innovative method to guide a new thinking in identity design through a mixture of principles of dynamic systems in design, has become prevalent in this digital world.

## **Research Aims**

This research attempts to achieve the following objectives:

Explanation of ways to achieve dynamism in the elements of visual identity to find a flexible design that helps to develop and rehabilitate the visual vision.

- Clarify the rules of the dynamic logo that keeps pace with the communication revolution.

Presenting models of different shapes that fall under the name of flexible dynamic design, and thus the ability to change the visual vision itself and the extent of the impact of these aspects on the survival and success of the visual identity

## **Research Methodology**

This research is based on the descriptive historical method.

## Introduction

For more than twenty years, the idea that an identity centered on a particular logo represents the only possibility, and the most effective in many practices, has been discussed later. The concept of "post-logo" has emerged to emphasize that "personality" can be effectively expressed using criteria that highlight differences, or contradictions, according to a more dynamic and flexible logic. Fig. 1 Visual identity tends to represent the variations of 'style', using a system of grammar, its inherent variations, and the variety of possible expressions of it.

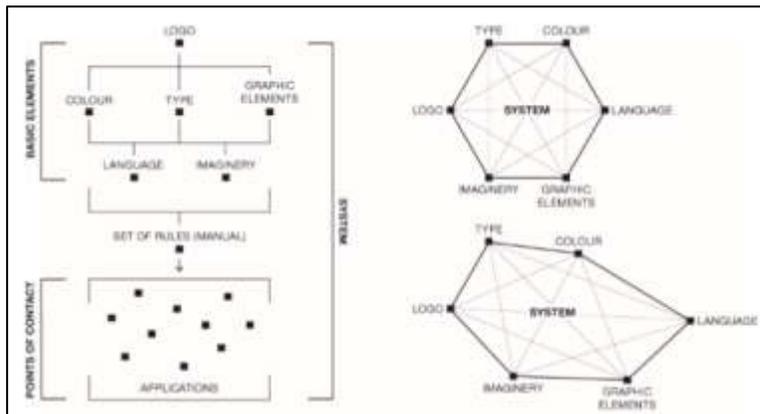


Figure (1) on the right, a representation of how dynamic or flexible visual identities work, and on the left, a representation of the structure of a typical or static visual identity

(Ermannoa, Guida, Ernestob, Voltaggio, (2016), p.421)

## Visual identity elements

Visual identity consists of six different elements that help to form a changing system by controlling them by linking them. .

(Jachum, Emanuel, (2013), p14)

## **1-1- logo**

One of the most important components of identity, and in most cases, it is considered the entity of visual identity. The visual identity system consists of several different parts, but the logo still has the main role. The logo can be iconic (containing an image or graphic symbol only), text (containing text only) (logo type), mixed (graphic symbol + text), or simply an abstract (shape shape). of geometric shapes and their products), in order to determine the basic elements of logo design.

(Adîr, George, Adîrb, Victor, Pascuc, Nicoleta, (2012), pp650-651)

## **1-2- Typography elements**

Typographical elements include everything that is written, illustrated or drawn within the design framework with the aim of creating different levels of attention-grabbing while achieving readability within a digital framework surrounded by continuous features of development.

## **1-3- color**

Color plays an essential function in the design of the visual identity. Choosing a specific color range may affect the appearance in general, as well as the choice of the color group for the logo, and it is an indication of its concept and the illustration as a whole. Besides, color is the element that differentiates between different products, and helps to perceive The visual identity is specific to an institution, without the need to look at other elements to confirm the association of that institution with this identity.

(Jachum, Emanuel, (2013), p14)

## **1-4- Graphic elements**

Graphic elements include an unlimited range of different shapes, shapes, lines, and pictorial symbols, which help to highlight certain elements and work to convey information and data as well as emphasize them, and simplify any of the complex information and make it understandable and interpreted. between them.

(Pisklakov, Pavel, (2016), p3)

## **1-5- The image is an image**

Images help communicate the value of the brand and express its story as a link between the content, the surrounding environment and the consumer and works to deliver communication messages quickly and effectively.

## **1-6- language**

The concept of language here is referring to unique names given to the services or products of an organization such as Apple, as well as other sub-products that it has produced, which are considered as a series of products bearing sub-brands under the name “I” such as i-phone / i-pad/ i- pod, the language element is among the components of visual identity.

(Jachum, Emanuel, (2013), p14)

## 2- The logo

From 'static logo' to 'post-logo'. From static-logo to post-logo

Nowadays, the traditional strict hierarchy of visual identity - which we can call the static-logo style - which has become more coherent over time, is now called into question, as many factors have contributed to this change including: the technological factor above all , as well as other factors related to criticism, aesthetics, and ethics of communication.

Shaughnessy emphasized that “a brand is no longer just a beautiful, organized logo, placed in the same place every time. The brand is flexible, it has become a place for change, and it is not static, so there is no such thing as a single brand. There are ways that allow the shape to be consists, allowing for communication and recognition, "in some areas of visual communication design, the idea of imposing strict rules has been abandoned in favor of more fluid and expressive languages, which are characterized by "mutability, reference to context, practicality, performance, non-linearity, and coherence" , diversity" which we might call a "post-logo".

Modern technologies offer wide-ranging possibilities to control the design, its structure and its evolution compared to the past. These techniques also provide the designer with the possibility of programming, not only for two or three dimensions, but also for the fourth dimension (the time dimension), which modifies the appearance of the image, not in a simple control way, but through programming.

(Gambafdella carmine (2014), pp. 1114-1115)

## 2-1- Logotype structure

One of the stages of building a linear logo in a fixed, flexible and meta (dynamic) way - to show how a particular structure corresponds to each one of them, which are, respectively, the static structure, the flexible structure, and the variable or dynamic structure. This is done through "exercices de style", a work similar to a group of different ways of telling the same story.

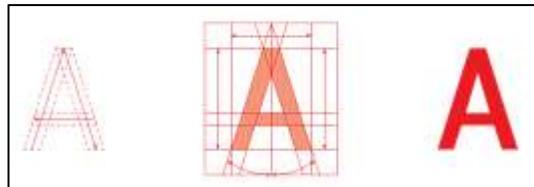
The fixed motto, whose structure is immutable, was designed according to the modernist dogma: "a little is a lot". In fact, the logo consists of a simple and organized letter, in which any unnecessary element has been excluded. The Linear Logo is presented in the same way as most corporate brochures: covered with a strict geometric grid with an appropriate safety zone. (Fig. 2)

The flexible, linear logo, with its dynamic structure, follows the so-called "post-logo" design approach. It refers in particular to the category of horrible (over-structured) logos based on the "mask/network" relationship. So far, only a simple matrix has been used to build a visual identification system in which we can identify each element as part of a whole. The grid defines not only the structure of the linear logo, but also the design of a series of 16 identical textures. Since a fluid system must have some "inflexibility" or immutability, not only to maintain its recognizability, but also to achieve greater impact), the "container" (the outline) and "content" (the content) and (the filling) of the linear logo are identical, allowing the dynamic histology to appear on the static background. (Fig. 3)

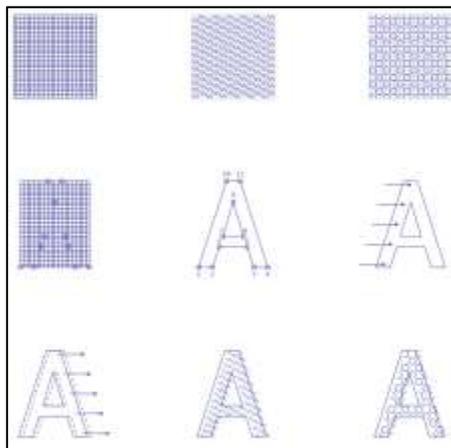
The Meta (dynamic) linear logo has a dialectical structure and is designed to complement six main designs, by following these steps:

- Determine the various parameters. (Fig. 4)
- Carrying out multiple master designs. (Fig. 4)
- Fulfilling multiple major designs within a framework. (Fig. 5)
- Generate linear logos. The parameters chosen for illustration are: weight, inline size and inline displacement (Fig. 6).

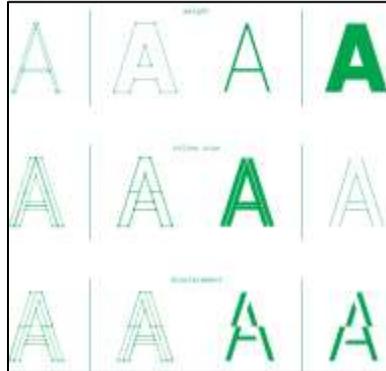
The first parameter is the most common of the typographical options, while the other parameters are unaccustomed. The internal scaling governs the behavior of the inner font, between "invisible" and "very thick," which eats up nearly all of the color in the letter. Accordingly, the internal displacement cuts the inner shapes in half, and determines their position, from left to right. (Biffi, Marcello, (2016), p.46)



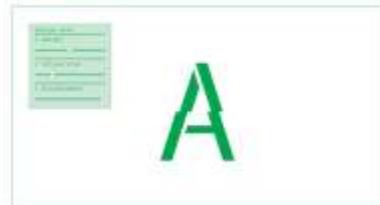
(Figure 2) shows the design process for a fixed. linear logo



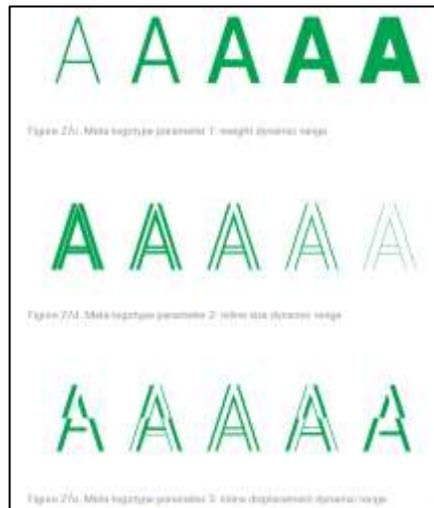
(Figure 3) shows the design process of the flexible. Linear Logo



(Fig. 4) shows the determination of the various parameters; Doing multiple master designs



(Figure 5) shows the fulfillment of the various key designs within a framework



(Fig. 6) Generating linear logos. The parameters chosen for illustration are: weight, inline size, and inline displacement.

(Biffi, Marcello, (2016), pp.47-48-49)

## **3- Dynamic logo**

It is possible to identify five aggregates of cases in which the design of a logo or a visual system leads to a better interpretation of the idea of the multidimensional nature of brands.

### **3-1- Dynamic logo based on aesthetics**

In the first group, the logo, or the main element of the visual system, changes over time and in the different situations in which it is applied, according to the specified control parameters (shape, color, font, etc.), and in all cases, according to the logic of differences that controls it, and predefined expansion limits.

We see those cases in which modifications are made to the basic mark, with the aim of communicating the new idea of a museum or cultural heritage place, and to convey a sense of diversity in content, initiatives, and general character, that is, it pursues specific goals with the public. In this regard, Brooklyn Museum Director Arnold Lehman declared in the press release during the presentation of the New Visual Identity program, "I am convinced that the fluid graphic identity and logo best express the goals of the visitor-focused museum." and "that they symbolically represent the diversity of our exhibits, and our audience" in a new way.

The new logo consists of a fixed letter "B", behind which it changes continuously eight different seals or shapes in a bright blue (Cyan) color. These eight seals are used indiscriminately to emphasize the uniqueness of the museum. The visual identity designed by Studio 2x4 is used in all printed materials and has been adapted to suit all promotional and online applications. Michael Rock, Creative Director of Design, introduced the logo this way: "We designed the new logo to express flexibility, change, surprise, and accessibility."

The dynamic logo is designed to represent a museum striving to rid its logo of the familiar and established concept, through continuous experimentation, openness, and most of all, reinvention.” The constant process of changing the logo gives different forms each time: a seal, a flower, something powerful, a bubble, water spurting, leaving open possibilities for expanding the stock of shapes used. This design is therefore based on a strong and common goal, between the client and the designer, that of renewal. (Gambafdella, carmine, (2014), p.1116)

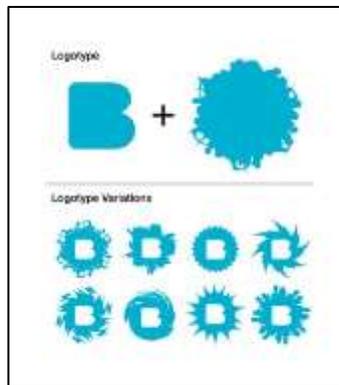


Figure (7) shows the Brooklyn Museum (New York),

Logo Variations, Designed by Studio 2x4, 2004

<https://www.pinterest.com/pin/281263939203601216/> 22.9.2020,3:26

Over the past years, this approach has influenced a certain number of designs, such as that of the Historiska Museet, one of Sweden's largest museums made up of collections of more than 10 million individual pieces from a history spanning thousands of years. The museum is also a venue for lectures, concerts, and activities for all ages.

The new visual identity is based on a new communication strategy that aims to make the Swedish Museum the number one storyteller in Sweden, sparking curiosity and interest in Swedish history. Bold Design Studio has created a dynamic and playful identity inspired by the museum's function: to create curiosity and interest in history, and to make the visitor reflect on the connection between the past and the present. The logo is a combination of a classic font with embellishments (extension) to express (the past) and a modern font without embellishments to express (the present). The interesting aspect is that the classic part with the motifs can be replaced by a historical artifact, giving the museum an opportunity to play with the visual expression of the motto, displaying the large collection of the museum's exhibits and activities. The result is a platform as much as it is an open system, offering endless communication possibilities. shape (8) (Gambafdella, carmine, (2014), p.1117)



Figure (8) Swedish Museum of History (Stockholm), Logo Variations, Designed by Studio Bold, 2012.

<https://bpando.org/2014/02/28/logo-historiska/> 22.9.2020,3:27

## **3-2- Dynamic logo based on visual codes**

The second group is the one whose design aims not only to define a set of variants, but aims primarily to run the process that manages such variants, thus formalizing the visual code, which when used becomes an authentic language, those cases use a special and personal code management program visual code and its creation.

The visual identity of the Casa da Musica designed by Stefan Sagmeister allows us to present the second group in Figure (9). This design is actually based on (Logo Generator) software that allows managing the logo, which is clearly inspired by the shape of the building, from several different sides (six sides). The logo changes and transforms in its various applications, and it changes from media to media, and similarly its colors can change. Since this is an institution that aims to host various initiatives related to the world of music (from jazz to classical music and contemporary forms of expression) Each target different types of audiences, their visual identity cannot be static. In fact, the system allows choosing from a custom color palette of images by themes, for each particular event or initiative. Corporate applications of their diversity are managed similarly: for internal employees, for example, business cards are personalized with a logo with colors taken from the card holder's profile picture. Therefore, the system offers a variety of solutions for both those responsible for managing identity daily, and those who benefit from it.

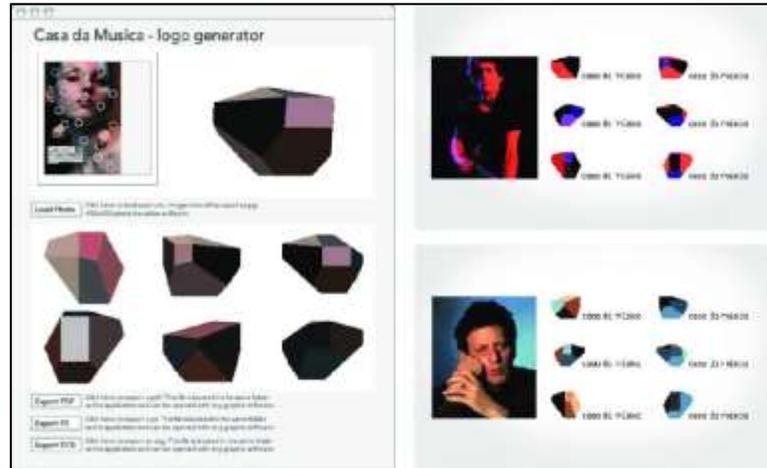


Figure (9) shows the House of Music (Porto), the logo generator

[https://www.researchgate.net/publication/305726365\\_Programming\\_Visual\\_Representations\\_Evolutions\\_of\\_Visual\\_Identities\\_between\\_Tangible\\_and\\_Intangible/figures?lo=122.9.2020,6:20](https://www.researchgate.net/publication/305726365_Programming_Visual_Representations_Evolutions_of_Visual_Identities_between_Tangible_and_Intangible/figures?lo=122.9.2020,6:20)

### 3-3- Dynamic logo based on algorithms

The third group, the dynamic identity standard system, uses some rules or algorithms to change the logo in order to create a wide range of different versions of the logo. These rules and algorithms are usually based on random selections of some parameters to achieve logo diversity, so they can be described as a zero algorithm.

(Pisklakov, Pavel, (2016), pp2-3)

#### Algorithm 0

- Select the parameter, and change its value to the value chosen at random.

- Repeat step #1 as many times as necessary.

After the algorithm is applied to the logo, the result should be evaluated according to two parameters (ie two parameters): recognition level (whether the result looks like the original logo) and variance (whether the result contains significant differences). The main problem with the zero algorithm is its uncontrollable result: sometimes it gives a good result, but other times the result varies too much or too small. So the random choices in an algorithm zero must be constrained by a certain set of rules to bring this randomness under control, so it can be described as algorithm 1.

## • Algorithm 1

- Establishing a set of rules to control randomness.
- Determine the parameter, and generate the randomly chosen value for this parameter.
- If the resulting value does not meet the set of rules, another one is generated.
- If the generated value satisfies the set of rules, the parameter value is changed to the generated value.

Repeat step 2 several times if necessary.

This algorithm gives more predictable results. This association helps to preserve the recognizability of the visual identity system and its parts (eg logo). This algorithm can be described as an algorithm with controlled randomness. CONTROLLED RANDOMNESS

It is a method of generating a wide variety of variations that retains certain elements of the visual identity system design without changes. A more detailed discussion of the concept of controlled randomness can be found.

(Pisklakov, Pavel, (2016), p3)

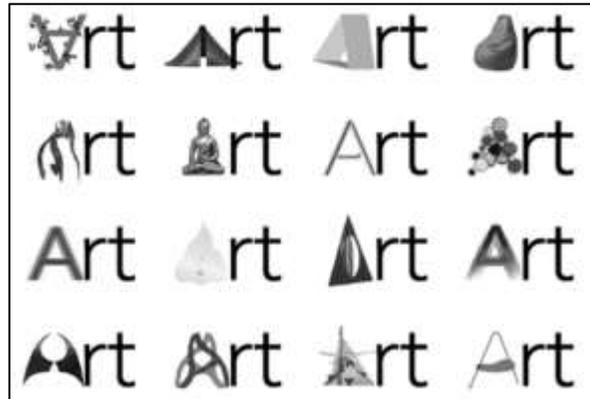
Each component has its own parameters that can be changed widely. Some of these variables are great for the logo, and some are not, so the variables have a different impact on levels of recognition and diversity.

Factors of large variables reduce the level of recognition and increase the level of diversity, but if the variables are not constrained by some rules, it may be difficult to recognize the result achieved as part of a particular system of visual identity, that is, it looks very different from the original, so we can say that it is not. It represents a variation of the logo, it is a completely different logo. If the parameters are not large (for example, it is just a small difference in size - 11.5 points instead of 12 points - or in position - one circle moves left by 0.5 mm), the level of familiarity remains high, but the level of diversity is also low, so we can say that there are absolutely no changes in the logo.

(Pisklakov, Pavel, (2016), p4)

Thus the changes must be large by a certain amount, and they must be constrained by a set of rules that help to maintain recognition, but provide a significant level of variation. For example, graphic designer Paula Scher created the new identity for the Philadelphia Museum of Art in 2014 (Fig. 10). The logo contains the letter "A" dedicated to the word "Art". The letter "A" is recognizable in the word "Art", but it is made of different materials, different colors, and can be replaced by any object of a suitable shape.

(Pisklakov, Pavel, (2014), p5)



(Pisklakov, Pavel, (2014), p5)

Figure (10) Logo of the Philadelphia Museum of Art (2014).

Image source: pentagram.com

So there are two rules for maintaining the recognizability of this logo:

- The letters "rt" must remain the same.
- The letter "A" in the word "Art" must be recognized (to some extent).

There are also two bases for achieving diversity in this logo:

- "A" color can be changed
- Can change the shape of an "A" (Pisklakov, Pavel, (2016), p4)

This example illustrates the principle of developing a set of rules: some rules in that set should be about maintaining recognizability, and some rules about achieving diversity. So it can be described by Algorithm 2.

## • Algorithm 2

- Establishing some rules to maintain the possibility of recognition.
- Set some rules to achieve diversity.
- Select an element according to the rules mentioned in step 2, define a parameter for the element and generate a randomly defined value for that parameter (note: each element - in shape, position, size and color - has a different parameter: for example, position has three parameters - position on the X axis , position on the Y axis and position on the Z axis)
- If the generated value does not meet the rule set from step 1, it is generated again.
- If the generated value satisfies the set of rules from step 1, the parameter value is changed to the generated value. Repeat step 3 as many times as necessary.

This algorithm provides more predictable results than Algorithm 1, because the set of rules for preserving recognition provides an opportunity to maintain a high level of recognition.

(Pisklakov, Pavel, (2016), p5)

## **3-4- Dynamic logo based on data**

The fourth group In this work, we present an innovation for another meaning of typography, and explore the common points between type design, visual identity design, and information visualization. We explore how data can affect logotype design, And how a linear logo can convey information. We chose the University of Coimbra (UC)- as a case study, and a data-driven linear logo design has been made from several colleges.

The proposed linear logo design is influenced by the current diversity of students in all the faculties of the university. It is also able to integrate and unify the different faculties in a coherent manner, changing over time to adapt to the data entered and related to the students. The result is a dynamic, linear logo capable of representing the university's different faculties.

(Parente, J´essica, Martins, Tiago, Bicker, Jo˜ao, (2018), p.1)

## • data

Where data was collected from a number of students based on each gender and nationality. The data used reflects the situation in 2015, only college data for bachelor's and master's degree students were used. In the end, work was done on eight colleges: College of Arts and Humanities (FLUC), College of Law (FDUC), College of Science and Technology (FCTUC), College of Pharmacy (FFUC), College of Economics (FEUC), and College of Psychology and Education (FPCEUC), College of Sports and Physical Education (FCDEFUC), and College of Medicine (FMUC). Figure (2-16) shows the collected information. In terms of nationality, we found four groups that correspond to: Portuguese students (PT), students from countries that use Portuguese as an official language (PL), students from European Union (EU) countries, and students from other countries (O).

(Parente, J´essica, Martins, Tiago, Bicker, Jo˜ao, (2018), p.3)

Faculty	Gender	Nationality				No. students	
		PT <sup>a</sup>	PL <sup>b</sup>	EU <sup>c</sup>	O <sup>d</sup>		
FLUC	female	1290	135	24	21	1470	2447
	male	857	90	16	14	977	
FDUC	female	1510	319	10	10	1850	2890
	male	849	180	6	6	1040	
FCTUC	female	2202	166	19	49	2437	6210
	male	3410	258	30	76	3773	
FFUC	female	956	17	2	5	980	1272
	male	285	5	1	1	292	
FEUC	female	860	139	12	21	1033	1984
	male	792	128	12	20	951	
FPCEUC	female	1211	84	15	4	1314	1524
	male	193	14	2	1	210	
FCDEFUC	female	228	11	0	1	240	676
	male	413	21	0	2	436	
FMUC	female	1464	33	6	5	1507	2259
	male	730	16	3	2	752	

Figure (11) shows the collected information about the colleges

(Parente, J'essica, Martins, Tiago, Bicker, Jo~ao, (2018), p.4)

## • LETTER FORMS

At the university there is a large group of students. Under these circumstances, it becomes natural to choose diverse letter groups to represent this diversity. To achieve this, four typographical classes were selected - garaldes, reales, didones and linear - and from each of them selected some lines. And the linear logo of each college was designed from the initials of its name. And overprinting the selected fonts for each of those initials in Figure (12) and the main objective of that is the desire to unify the characteristics of the selected set of fonts.

(Parente, J'essica, Martins, Tiago, Bicker, Jo~ao, (2018), p.3)

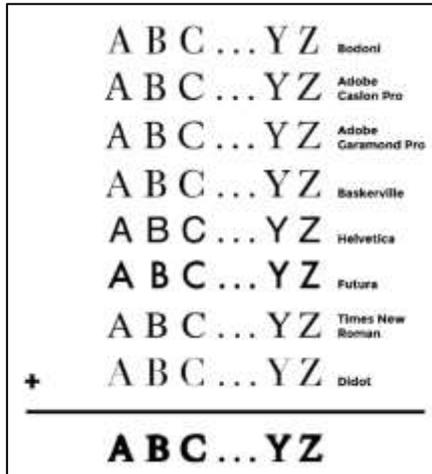


Figure (13) illustrates the creation of letterforms by typing or duplicating a selection of fonts.

<https://cdv.dei.uc.pt/data-logotype-faculties/> 21.9.2020, 3:33

## • ITERATIONS . REPEAT

After letterforms are produced, a way to fill in the shapes is needed. The next step is to develop a grid that will be placed on top of the previously created shape. Therefore, three variables need to be represented: (1) nationality, (2) gender, and (3) number of students. The number of students has been linked to the density of the elements (Fig. 14).

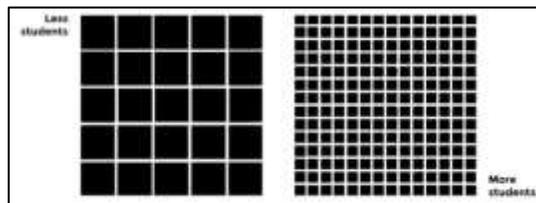


Figure (14) shows the representation of the number of students using density

During the development of this project, different approaches were tried, and in the end the UNIT - a drawing - designed a shape (15) and a color for each gender for each nationality. This allows the two variables to be combined.

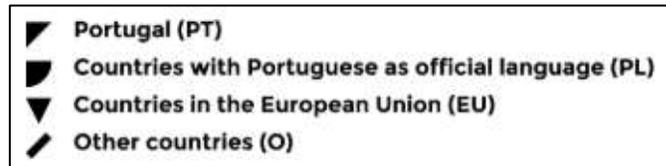


Figure (15) illustrates the representation of students' nationality using graphic elements

In order to distinguish between the elements of each gender, the classes (Fig. 16) were used. In other words, the elements were placed in two layers in the form of pre-designed letters, each layer for a gender. Then draw the elements from top to bottom and from left to right. The layers were superimposed, but not aligned. In order to obtain a visual perception of all the elements, a multiply effect was implemented.

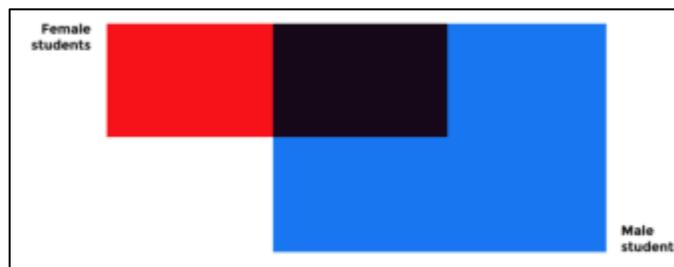


Figure (16) shows the representation of students' gender using color

For each college, the maximum space occupied by the features in each letter is related to the maximum number of students by gender. The minimum allowable further variation between densities is also defined, as it limits the range of intensity values. <https://cdv.dei.uc.pt/data-logotype-faculties/> 21.9.2020,3:35

Finally, the linear logos in Figures 17 and 18 were reached. Red and blue represent the amount of women and men, respectively. For graphic units, the right triangle represents Portuguese students, a quarter of the circle represents students from countries that use Portuguese as an official language, the other triangle represents students from within the European Union, and the line represents students from other countries

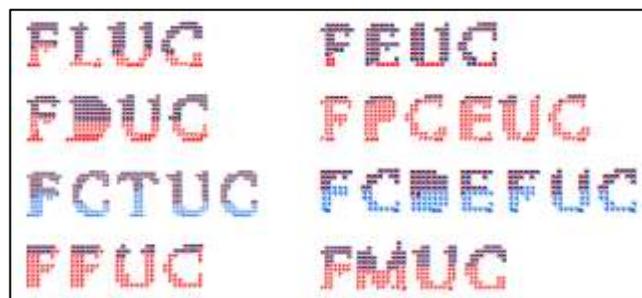


Figure (17) shows the types of linear logos that we designed in the final iteration. The units represent the nationalities of the students; The colors represent their gender (male/female); The density of units represents the number of students.

(Parente, J´essica, Martins, Tiago, Bicker, Joˆao, (2018), p.6)

Thanks to the rotation of the units, it is possible to visualize each layer and the points of contact between them. Owing to the difference in density, we have noticed that FCTUC is the college with the largest number of students, and on the other hand, FCDEFUC and FPCEUC are the two colleges with the lowest number of students. Looking at the Linear Logos, we can also note that the female students in the College of Psychology and Education (FPCEUC) outnumber the male students. Moreover, as expected, male students at the College of Sports and Physical Education (FCDEFUC) are the most numerous.

<https://cdv.dei.uc.pt/data-logotype-faculties/>

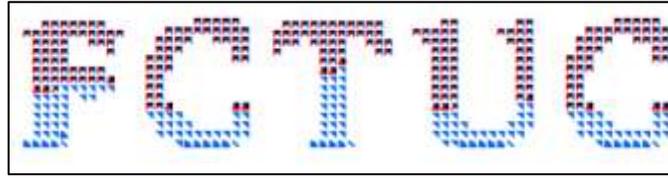


Figure (18) The logo of the College of Science and Technology that is generated in the final iteration

<https://cdv.dei.uc.pt/data-logotype-faculties/> 21.9.2020, 3:37

In this project, the concern was the commitment to test minimum and maximum densities. In order to reduce details, reduce volumes, the minimum and maximum density had to be reduced. In Figure (19), we have five different levels of densities represented. In this iteration, the area occupied by each unit in the grid space where it is placed is tested. For a better understanding of the subject, here some tests were presented in Figure (20).

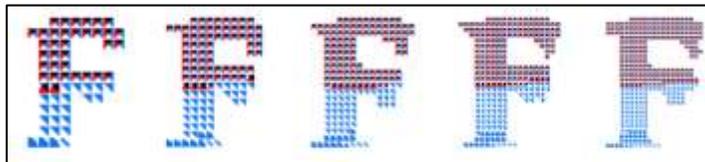


Figure (19) shows various forms of the letter F with different levels of modules' density.

<https://cdv.dei.uc.pt/data-logotype-faculties/> 21.9.2020, 3:37

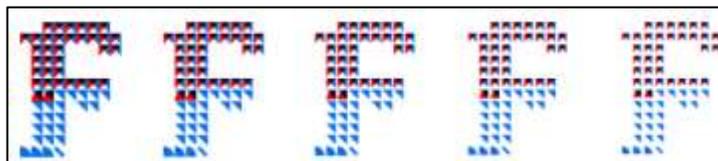


Figure (20) shows various forms of the letter F with different unit sizes MODULES SIZE.

(Parente, J'essica, Martins, Tiago, Bicker, Jo~ao, (2018), p.6)

## **3-5- Dynamic logo based on parameter**

### **• Parametric Design**

Parametric design originated from manual design. The main difference in parametric design is the application of computer programming techniques, compared to a typical freehand drawing template for the design diagram (\*). Its purpose is to create an automatically generated design system that can be modified at any time. Therefore, parametric design may change in three aspects: Design Processes (DP), Design Thinking (DT), and Design Tools (DT).

### **• Parametric design process**

A typical thought process is the parametric design of Ali

First: and above all, taking into account the concepts and ideas that correspond to the needs of customers and design tasks, and presenting them in graphics, text or data.

Second, designers constantly abstract and digitize ideas and concepts, explore rules of engineering logic, and include evaluation rules. Gradually, the designer establishes a set of mathematical rules and interconnected data structure.

Third: The designer must standardize all parameters, including their definitions, codes, and nomenclature, and clarify the relationship between design inputs and design response (design outputs). Furthermore, designers need to take care of the internal data flow that transports the parameters to form a control parameter in the organic system.

Fourth: The designer writes the code in a program environment according to calculations, rules, and data structures, runs and debugs the program, and checks the response of the design.

X Li1, JN Su2,a (2018), pp.2-3))

## • Parametric design thinking

Parametric means more than one way of thinking. This is mainly due to the intersection of three areas of knowledge: knowledge of professional design, knowledge of computer programming, and knowledge of mathematics. Parametric design does not deal directly with the model, but rather studies the mathematical logic underlying the model. Computer programs are used to calculate the various elements that affect the design (parametric variables).

Abstract thinking is the basis of parametric design, where design ideas or concepts are extracted in the form of code, data, variables, functions, etc. Mathematical thinking primarily involves how to translate mathematical theories and data structures into useful computations. The core of algorithmic thinking is step-by-step problem solving. Computational thinking in parametric design is the notation of functions (part of the numerical model) in programming languages. And modifying the function means modifying the numerical model. The computational management of data is key for designers to shape designs via programming technology. Meaning: the form of the impulsive data flow, the form of the organization of the data structure. All this is done by transferring data between different functions written in the programming language. In computers, the model is expressed with data. Designers achieve design goals through code design while the code records the designer's thought process. Therefore, the parametric thinking scheme can be understood as a process of integrating abstract thinking, mathematical thinking, and computational thinking in order to achieve the design goal by operating a computational mechanism according to the guidance of design knowledge.

## • The method of parametric logo design

First, designers must have a deep understanding of the culture, the market environment, the core values of the organization, the extraction of the basic requirement, and the basic visual elements.

Second, we need to find natural patterns that fit the design requirements. Natural patterns matching the corporate image can overlap and merge into many natural patterns. For example, symmetry and rotation can be combined with a helical pattern. After a successful match, the constituent visual bases and logic associated with the selected natural patterns, especially geometric logical relationships, can be studied. At this point, the designer can initially define the set of parameters for the logo template:  $\{s_1, s_2, s_3, \dots, s_n\}$ . After that, according to the geometric logical relationship, the governing logic of the shape, the designers can set the shape transformation rule, and transform all the rules into numerical calculations that transform the shape of the logo. On the other hand, the overall image of the logo is also affected by other factors, such as proportion, location, text, etc., and this requires creating some additional rules to achieve systematic consistency. Additionally, designers must define a set of color control parameters:  $\{c_1, c_2, c_3, \dots, c_n\}$  and color conversion rules based on the color design scheme of the logo and color space. The process of studying natural patterns is also a process of studying numerical computations. Designing a parametric shape is the process of conducting a parametric experiment. It constantly adjusts the rules and adjusts the parameters to meet the visual demands of the client based on design responses.

## The generator of parametric logo design

A creator worked on a parametric logo design (fig. 21), with Wolfram in software for Gansu ZBloom Cultural Media. On the left side of the logo generator interface is the logo parameter control bar, and on the right side is the logo browser. The parametric shape of the logo includes four parameters: the angle, the radius of the disks, the number of disks, and the size of the logo image. The resulting design, chosen by the designers, is designed by the logo creator according to different parametric values in Figure (22).

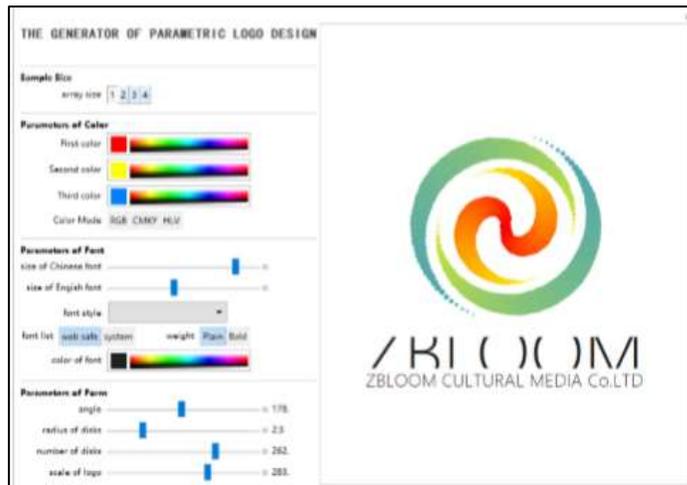


Figure (21) shows the work of a creator to design a parametric logo

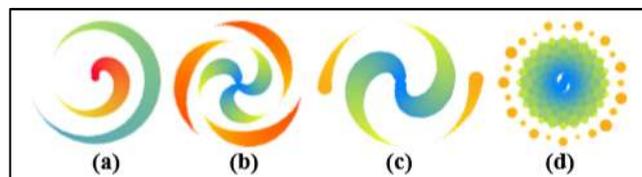


Figure (22) shows the logo according to different parameter values. ( X Li1, JN Su2, a (2018), pp.4-5)

## Results:

- It is clear from the above that due to the technological development, the visual culture has changed in societies and therefore in institutions, and the designers resorted to dealing with the modern development, which led to a change in the concept of logo design, and the feature of change became clear, which led to the spread of the dynamic logo.

- The use of the parameter system in logo design led to an attractive and diverse design boom for the logo, which led to an increase in the demand of institutions and organizations for these types of designs.

The paths of diversity and parametric modulation have led to many design solutions and innovation in dynamic logo design.

## Recommendations:

- The research recommends educational institutions for teaching the field of graphics by introducing modern programs in logo design and applying a parametric system in design for dynamic logos.

The research also recommends inviting researchers to complete the research in the field of dynamic logo design and its diverse and modern applications.

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