Digital datasheet for archives of images

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PREAMBLE

Considering the several existing studies on history of design that have primary sources of printed materials as the object of their study, many researchers focus their efforts on the systematization and validation of their investigations through appropriate methodological procedures.

Within this context, over the years, the Laboratory of Design: History and Typography (LadHT) has built a methodological protocol to standardize and support the different types pf research on magazines, newspapers and other printed materials, carried out by its team of researchers. The first methodological effort regards to the researcher's approach to the socio-historical context of the printed material, including literature review and additional data collection methods, such as interviews. The second effort of the research focuses on the graphic analysis, divided in 7 steps: identification and mapping of collections, photographic record of the collection, organization of the digital collection, creation of the datasheet for the analysis of the printed material, data analysis and discussion of the results (Fonseca et al, 2016).

The aforementioned methodological set establishes guidelines, but also allows each researcher to make any necessary adjustments in the proposed steps. One step that always requires adjustments is the construction of the datasheet, since the definition of the variables that compose it must meet the particularities of the graphic object being studied.

This paper presents a suggestion for the construction of a datasheet for the analysis of images. Since it is a very specific field within the universe of graphic elements that compose a printed material, it was necessary to perform a literature review in order to format the proposal presented herein. On top of the focus on image analysis, the proposal foresees the digital construction of the tool, since the volume of images to be analysed may be a limiting factor for the research. In this proposal, we will exclusively analyse data on the syntactic construction of the images within the archive, without any kind of semantic analysis. This is because it would be unfeasible to make a qualitative analysis in a collection with such a high number of copies.

To perform the present research, we have used the case study of Chanaan magazine, published between 1936 and 1939 in Vitória, Espírito Santo, Brazil where 2,412 images were published. The main purpose of understanding the typology and characteristics of the images of the magazine has driven the construction of the datasheet to study the published images. The challenge was to develop a tool capable to standardize and optimize the data collection, and to validate the analyses through the systematization of procedures and statistical treatment of the data.

DEVELOPMENT OF THE DATASHEET

After digitalizing and indexing the collection of Chanaan magazine, we began the construction of the image analysis plan. The aim was to identify typologies and characteristics of visual construction, as well as the use of images along with ornamental, typographic and calligraphic elements.

According to Freitas et al (2013), methodology is the science that deals with the study of methods, techniques or tools, and their applications to the definition, organization and solution of theoretical and practical problems that help researchers and designers in their process of constructing a strategy plan to attain a result.

In order to obtain a strategy plan and achieve a valid result, we began developing the datasheet, which will be later reported to point out the analyses variables, their sources and their purposes.

> The definition and recording of technical variables of the printed material (whether quantitative or qualitative) is of utmost importance, as they can determine the course of the research. The established variables define the technical parameters of the research, recorded through the datasheet created for this purpose. Therefore, it is possible to reduce complex print characteristics to simplified indexes, as a type of summary. The datasheet can be physical or digital, provided that it presents a structured schedule for data collection (Fonseca et al, 2016, pp. 6-7).

To create the datasheet, we have used some classifications set by the preliminary research on the magazine as a reference. That research approached general information, such as: number of issues and dates, number of pages, type of paper used in printing, number of ads, use of images, price, visual characteristics of the cover, printing area, typography used in texts and titles, types of signatures and captions (Azerêdo et al, 2015; Azerêdo and Fonseca, 2016). As a result, from this first look, we were able to decide which elements should be investigated with greater attention.

Ricardo Cunha Lima's master's degree dissertation creates a methodology for the analysis of journalistic infographics as a part of information design (Lima, 2009). It addresses the elements that create visual and pictorial language. In the present research we have adapted some classifications presented by the literature review of Lima's work, such as Shape, Size, Colour and Orientation, based on the work Semiologie Graphique, by Jaques Bertin (1983); as well as Clive Ashwin's Consistency, Range Imaging, Framework and Naturalism (1982), which argues that the graphic syntax unswervingly influences the final interpretation of a message (Ashwin, 1982 apud Lima, 2009). The presented parameters served as a foundation to develop categories that support the interpretation of visual construction of these images. For this reason, the classifications were meticulously tested and adapted to be applied in the FII.

Finally, we have used employed categories to the photographic analysis, considering classifications applied to videos and to photography, starting from the classification of photographic layers (Paste, 2011; Rodriguez, [2010-?]). The first step in the construction of the FII was restructuring the digital archive, which included filtering the images that would be analysed, so they could be identified and cut according to the imagery elements found in their composition. These images were renamed so they would differ from the rest of the collection, now being named "Chanaan Clipping". The folders contain images with the nomenclature ordered by year, issue, page and number of the image in the page (CH_01_1936_02_01). This step was critical for the development of the technical variables used in the FII, for the knowledge of the archive allowed us to visualize and draft a preliminary profile of these images, and to decide on which variables would be applicable to the expected result.

To create the individual image file, the following groups were determined: Illustration, Photography and Photomontage. These categories were chosen after observing the imagery elements found during the organization of the collection. The first essential change in the composition of the datasheet was in the photomontage category, in which images that combine two or more photographs to form only one would be included (Porta, 1958). However, after carefully observing the composition, we concluded that the combination of photographs did not always form one standalone element; quite often its layout on the page was due to a differentiated diagramming, and not to form of a new image. Therefore, we included the Page Composition category in order to deal with the set of images that dealt with the same subject and were diagrammed in compositions that followed the same style, creating a unity effect on the page.

These categories were adapted after several tests, so they were more efficient in the collection of information, also to provide information regarding the aim of research at the end of the tabulation. This allowed us to trace a complete graphic

profile of the images published in the magazine. As mentioned above, different bibliographic sources were used to propose the variables used in the datasheet. All possible variables shall be discussed or considered, since the more detailed the proposed classifications, the greater the possibilities of filtering and number of attained information.

1. Year:

The year the magazine was published. Relevant information to filter and observe different graphic patterns throughout the years (Azerêdo et al, 2015).

2. Issue:

This is a highly relevant category, for it organizes and groups the results gathered per issue (Azerêdo et al, 2015).

3. Typology:

In order to create a classification of typology that was efficient and encompassed all the images, we drafted the elaboration of the categories since the moment we organized the collection. Therefore, while the images were renamed, we completed a list with the possible typologies that would be added to the FII (Azerêdo et al, 2015). The detailing in the description of the typologies during the renaming of the files will aid in the construction of categories by topics and their subdivisions. The captions support the entire data collection, since in the vast majority of cases it would not be possible to identify all individuals in the image, events and locations simply by looking at the image.

After studying the archive, we could identify the following themes and subcategories:

3.1 People:

Arts/cinema/theatre: People from the arts industry, musicians, actors, artists and any other event involving activities related to these items;

Health sector: Physicians, nurses, dentists and events related to this sector;

Entrepreneurs: Entrepreneurs of the great Vitória or from other places in Brazil, businesses and business events;

Children: Children and babies accompanied or not by their mothers;

Writers/Professors: Writers, poets, and professors in several areas;

Government officials: State and local government officials;

Journalists: Journalists;

Fashion: Fashion models, accessories, trends and sketches;

Politicians: Popular politicians such as governors, presidents, monarchs etc.

Women: Women in general;

Body parts: Hands, feet, eyes, etc.

3.2 Events:

Academic: Academic events such as graduation ceremonies, balls, meetings and school commemorative dates;

Artistic: Art exhibitions, plays and musicals;

Sports: Sports related events;

Politics: Government official events, military events, national commemorative dates, meetings and homages;

Social: Social events such as weddings, balls, parties, birthdays, that is, any strictly social events.

3.3 Places:

Architecture / Decoration: Included images with architectural content and which emphasized the structure and decoration of buildings, cities or physical environments;

Monuments: Outdoor or indoor monuments;

Constructions: Private or government constructions;

Landscapes: Landscapes in general;

Government buildings/Businesses/Schools/Hospitals: Government buildings such as local councils, public agencies and official residences, shops and factories, schools and their facilities, hospitals and their branches;

Squares/Gardens: Squares and gardens in general.

3.4 Others:

Opening section: Opening sections next to the title;

Historical illustrations: Illustrations or photographs portraying historical moments;

Ludic Illustrations: Illustrations or images that did not fit into a specific ca-

tegory, but accompanied and illustrated texts with ludic and creative references;

Other: Images that did not fit into any specified category.

4. Format:

This category was divided into rectangular, square, oval, round or irregular, so that in the final analysis it would be possible to state whether the images in the magazine followed a cut format or if they were bolder in their representations (Bertin, 1983 apud Lima, 2009). This category may also define whether the publication followed some aesthetic trend of the time.

Picture 1: 1 Example of Rectangular format (Chanaan, 1938, issues 22 and 23, p. 61); 2 Example of Oval format (Chanaan, 1938, issues 22 and 23, p. 19); 3 Example of Round format (Chanaan, 1936, issue 02, p. 37); 4 Example of Square format (Chanaan, 1936, issue 03, p.12); 5 Example of Irregular format (Chanaan, 1938, issues 22 and 23, p. 41).

5. Approximate size:

The approximate page size: one column, two columns, half page, top, full page, bottom and less than a column (Bertin, 1983 apud Lima, 2009). By studying the size of the images, we were able to understand the relevance of the images as content of the magazine, and the importance of their space for the layout of the pages.

Picture 2: 1 Example of images in one column (Chanaan, 1938, issue 24, p. 04); 2 Example of image in two columns (Chanaan, 1939, issue 29, p. 06); 3 Example of image in three columns (Chanaan, 1937, issue 20, p. 14); 4 Example of image in full page (Chanaan, 1936, issue 04, p. 23); 5 Example of image in half page (Chanaan, 1939, issue 30, p. 09); 6 Example of image on the top (Chanaan, 1937, issue 20, p. 20); 7 Example of image at the bottom (Chanaan, 1937, issue 20, p. 11).

6. Colour:

Black; Black + one colour; One colour other than black; Three Colours and Four Colours. This category was created to collect the colour use frequency and in the magazine issues (Bertin, 1983 apud Lima, 2009). The frequency and amount of colour can provide information on the production financial means, considering that colour printing was more expensive.

Picture 3: 1 Example of a black and White image (Chanaan, 1937, issue 15, p. 45); 2 Example of a black + one colour image (Chanaan, 1937, issue 21, p. 43); 3 Example of an image with a colour other than black (Chanaan, 1937, issue 17, p. 31); 4 Example of an image with three colours (Chanaan, 1936, issue 03, p. 42); 5 Example of an image with four colours (Chanaan, 1936, issue 04, p. 26).

7. Layout:

The layout can be categorised as horizontal, vertical and transversal (Bertin, 1983 apud Lima, 2009). This category helps to understand how the images behave on the page: more traditional, such as horizontal and vertical, or freer form and transverse, wich may indicate the attempt of a bolder and more experimental presentation;

Picture 4: 1 Example of Vertical layout (Chanaan, 1936, issue p. 27); 2 Example of Horizontal layout (Chanaan, 1936, issue 09, p. 19); 3 Example of Transversal layout (Chanaan, 1936, issue 08, p. 34).

8. Consistency:

At first, consistency was a category exclusively applied to illustrations, but it was later used for all other categories, as it helped us to observe how the imagery elements can be mixed to form a composition. The types are: (i) homogeneous: images that do not mix other techniques in their composition, such as photography or illustrations; and (ii) heterogeneous: mixes two or more types of techniques, such as photography with lettering (Ashwin, 1982 apud Lima, 2009). The abundant use of heterogeneous images can also indicate the interest of the magazine in experimentation, since the interferences of these techniques transform the original image into a new one, changing its style and original configuration. We could identify the following types of techniques: photography, illustration, lettering, typography and calligraphy.

Picture 5: 1 Example of Homogeneous photography (Chanaan, 1936, issue 10, p. 28); 2 Example of Heterogeneous photography comprising Illustration and Lettering (Chanaan, 1936, issue 10, p. 16).

9. Range imaging:

This category only applies to illustrations that intend to categorise the level of details within an image. The extended type is a composition that uses textures and more detailed and elaborated lines; and retracted type is the one that presents little detail (Ashwin, 1982 apud Lima, 2009);
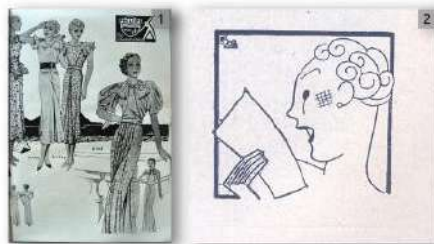
Picture 6: 1 Example of Extended range (Chanaan, 1936, issue 16, p. 39); 2 Example of image with Retracted range (Chanaan, 1936, issue 24, p. 33).

10. Framework:

This categorisation applies exclusively to illustrations. Images considered conjunctive have a background as a complement to the main illustration, for instance, a couple pictured inside the room of a residence, or a woman portrayed with a landscape in the background. In disjunctive images, the illustration is loose, where most of the pictures are cut up, such as the illustration of a man's bust (Ashwin, 1982 apud Lima, 2009).

Picture 7: 1 Example of image with Disjunctive framework (Chanaan, 1936, issue 02, p. 36); 2 Example of image with a Conjunctive framework (Chanaan, 1937, issue 17, p.11).

11. Naturalism:

This category is exclusive for illustrations. The intention is to check if the image was naturalistic or non-naturalistic. The naturalistic image corresponds to the representation of objects in a realistic way, as found in nature, e.g., illustrations of people that follow the conventional aesthetic and anatomical standards. The non-naturalistic would be a playful or fanciful representation, such as the image of an angel (Ashwin, 1982 apud Lima, 2009);

Picture 8: 1 Example of Non–naturalistic image (Chanaan, 1936, issue 01, p. 34); 2 Example of Naturalistic image (Chanaan, 1938, issue 55, p. 24).

12. Frame:

This category verifies the presence of frames around images. The frames can be (i) simple, considering those traced with a single line; (ii) composite, where the edges are more elaborated with other resources like double lines and adornments; and (iii) absent, when there is no frame around an image;

Picture 9: 1 Example of an image with an Absent frame (Chanaan, 1939, issue 30, p. 28); 2 Example of image with a Simple frame (Chanaan, 1937, issue 21, p. 02); 3 Example of image with a Composite frame (Chanaan, 1938, issues 22 e 23, p. 68).

13. Threads:

The threads were sorted as simple, composite or absent. Simple: threads with a single and continuous line. Composite: presenting more than one line, side-to--side or dotted, or decorated. The threads were used together with the image elements as an embellishment, unlike the frames.

Picture 10: 1 Example of image with Absent threads (Chanaan, 1938, issue 22 e 23, p. 61); 2 Example of image with Simple threads (Chanaan, 1938, issues 22 and 23, p. 03); 3 Example of composition of page with Composite threads (Chanaan, 1938, issues 22 and 23, p. 22).

14. Signature:

Signatures can be calligraphic or typographic. The purpose of this variable is to indicate how often photographs or illustrations displayed their authors, and it helps to recall who were the photographers and illustrators who published in the magazine. For this reason, we only took into consideration the signatures of the creators of the images, excluding signatures of people who were being portrayed.

Picture 11: 1 Example of signatures in page compositions (Chanaan, 1936, issue 02, p. 41).

15. Caption:

Classification of the absence or presence of captions in any type of image. This category shall be completed very attentively, because in many cases the textual content of the page may be confused with a caption.

Picture 12: 1 Example of a photograph with caption (Chanaan, 1938, issue 27, p. 68); 2 Example of page composition with captions (Chanaan, 1939, issue 30, p. 16).

16. Photographic layers:

Categorisation applied exclusively to photography. It categorises images according to photographic layers, namely: general layer, American layer, medium, medium short, primer layer, very first primer layer and detail layer (Paste, 2011; Rodriguez, [2010-?]). This grouping can contribute to the definition of the published photographs profile, producing results that can be compared with the photographic styles and techniques that were used and available at the time.
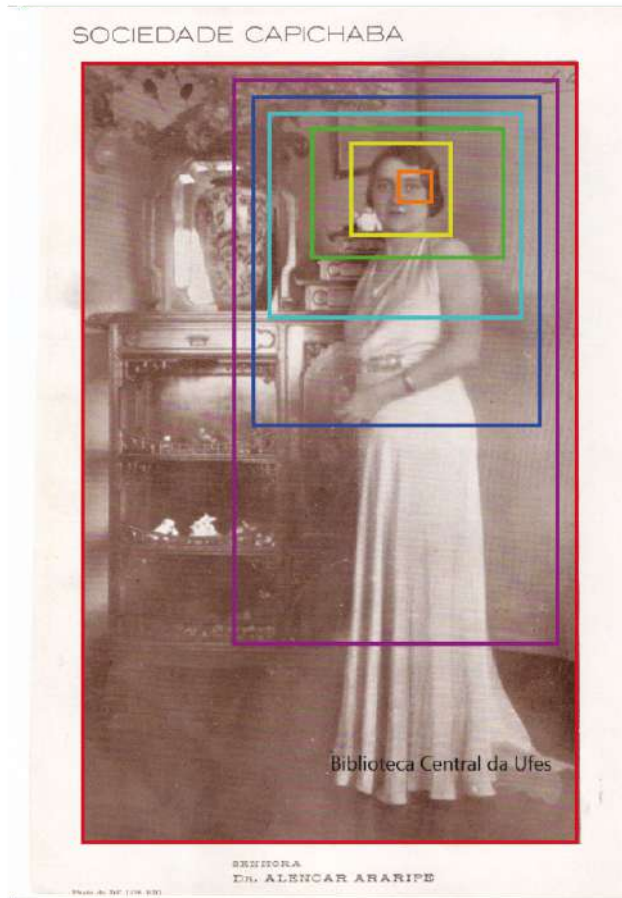
Picture 13: 1 Example of divisions in photographic layers. (Chanaan, 1936, issue 11 and 12, p. 42).

After deciding on the variables, we carried out tests and adjustments before formatting the datasheet. In a preliminary survey, we concluded that the magazine would have at least 1,133 elements to be analysed. This showed us that completing and tabulating data manually would be an arduous and lengthy task. As a result, we decided to format the datasheet via an online template, to speed up the completion and to transform the data into a digital spreadsheet automatically. The platform of choice was Google Forms, which is a tool used to develop online templates and where results are automatically sent to a spreadsheet linked to Google Drive. The Google tool is recommended because it is free and easy to use, and it also allows simultaneous sharing and use by multiple users, and therefore can be used by several members of the same research group, for example. It is necessary to study and have knowledge on the construction of the questions within the platform, so that we understand the data output. There are several possibilities of asking a question and obtaining answers in several formats. Tests were performed to acknowledge and visualize the results and the spreadsheet generated by the tool, and only after that, we decided which type of question would be used.

Designing data input through several answer methods was critical to create the digital FII, taking into consideration the output format for the spreadsheet, in order to simplify the tabulation. We understand that this method facilitates the creation of charts about each variable or for comparison, as seen below.

1.   Open-ended answers.
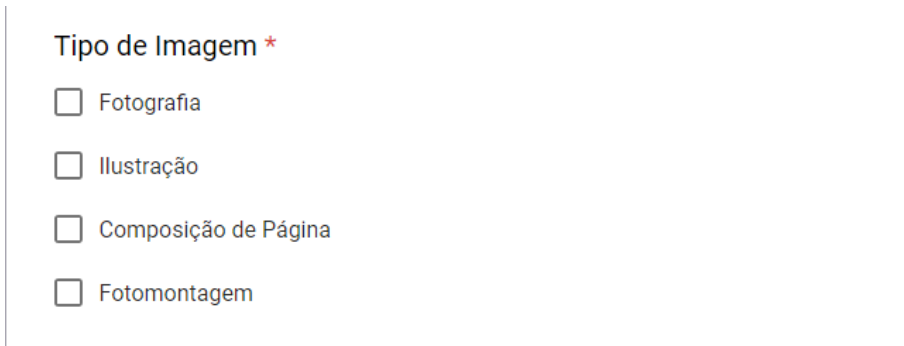
This option was used only in the name category, so that it would be the first information to appear on the table line, making it possible to identify the image simply by reading the assigned nomenclature. Open-ended answers are recommended solely for classifications that should not be counted at the end, because it is much more difficult to add up and filter data with a high number of variables. The open-ended answers are recommended in cases where it is necessary to identify some kind of data that does not repeat itself or that is repeated only a few times throughout the collection, e.g. the name of the issue (no repetitions).

Nome *

Sua resposta

Picture 14: Example of categorisation using open-ended questions in FII.

2. Multiple-choice.

We created multiple-choice questions to accommodate classifications with only one possible answer, such as Image Type, Total Number of Images, Frameworks, Threads, Signature, Caption, Frames, Naturalism, and Range Imaging categories.

Tipo de Imagem *

☐ Fotografia

☐ Ilustração

☐ Composição de Página

☐ Fotomontagem

Picture 15: Example of classification using multiple-choice questions in FII.

3. Columns and lines:

This type of response was intended for classifications that involve a large number of variables and needed to be counted in the final tabulation. The final solution was to organize the responses in a column layout, where the first column is the possible classification of the image and the second column is a series of numbers from one to ten, to be marked according to the number of times this variable is present. In the final tabulation, the answers are grouped side by side, and each option has its own column with the results in numbers (therefore easier to add up). In cases where it was necessary to mark a number above ten, the correction was made directly in the spreadsheet (which is editable and can be modified at any time). This modality was applied to the following categories: Typology, Consistency, Form, Approximate Size, Colour, Orientation and Layers.

Picture 16: Example of classification using Columns and Lines on the FII.

4.   Dropdown box.

The dropdown box was used exclusively to identify the issue number, saving space in the datasheet layout with its 'hidden' elements inside the field.

Picture 17: Example of classification using a Dropdown box.

The digital datasheet was more responsive in relation to the time spent to fill out the data during the first tests performed with the templates made with the text editor, since each field was designed to receive each type of information. In addition, the information was organized in an appropriate layout, with options that made navigation easier. With the digital FII, it was possible to complete approximately 1,133 datasheets in 31 days, with an average time of 8 minutes each. After completing all the datasheets, the final result of the all the images in Chanaan Magazine was of approximately 2,412, with several images on each page; 16 being the highest number of images per page.

Another relevant topic for the effective completion of the FII is training the team that will be responsible for completing the templates. Ideally, the entire research team shall be familiar with the template, the collection and the particularities that can be found, since questions can often arise regarding to which category a particular variable belongs. The team needs to be trained and in about the classifications, because in ambiguous cases they can be confusing and generate false results. In our case study, when unusual situations occurred, we discussed the classification in question with the research team in the laboratory, so that we could be sure about the best decision to make.

DATA TABULATION

Information design is critical to format charted data and view the results of the analyses of the images, as it shows how to select, organize and present the information for a given audience (Wilbur and Burke, 1998).

For this purpose, we can mention important actions taken during this phase of the research. For instance, the use of colours to label and represent groups of information; the use of filters in the spreadsheet to segment data in different ways; the definition of the best chart for each type of information, such as use of sectors for qualitative variables, chart bars for quantitative variables and line charts to observe the behaviour of the variables over time (Gomes and Fonseca, 2011).

The Google Forms tool provides an editable spreadsheet linked to the Drive of the account responsible for creating the template. The spreadsheet can be shared with other users or be set as accessible exclusively by this account so the person in charge of the spreadsheet holds exclusive editing access, or it is possible to assign this task to other users of choice, according to the research needs and to the team. This spreadsheet only displays the entered data, without any formatting to assist in the identification of the information.

To simplify the identification of each set of responses formed by sequential columns, we applied colours to the spreadsheet headers, thus making the separation clearer and easier to identify. In addition, we renamed the top of the columns, formatted them with bold style and increased the body of the typography to distinguish each cluster of information.

The spreadsheet created from the input data showed each question in column format, allowing statistics output to create results, charts and comparisons.

Picture 18: Picture of the spreadsheet after data tabulation of FII.

The first variable collected by the digital FII was the nomenclature of the archives developed to catalogue the images. We were able to apply an alphabetical order sort filter and to order the information according the date of publication and the number of the image. Next, we can see the year, issue and type of image, because they will be the main variables to be filtered in this case study.

All categories were developed and perceived in a way to provide us with data that would be easily filtered and organized at the end of the tabulation, thus several variables had output numbers responses, that facilitate and streamline Excel's automatic and mechanic counting systems.

Since the variables do not apply to all types of images (illustration, photo, photomontage and page composition), some questions were not mandatory, and could be skipped in the final tabulation of data. This is because making separate datasheets for the exceptions would make the completion task even lengthier, making it difficult to unify and cross all the data at the end.
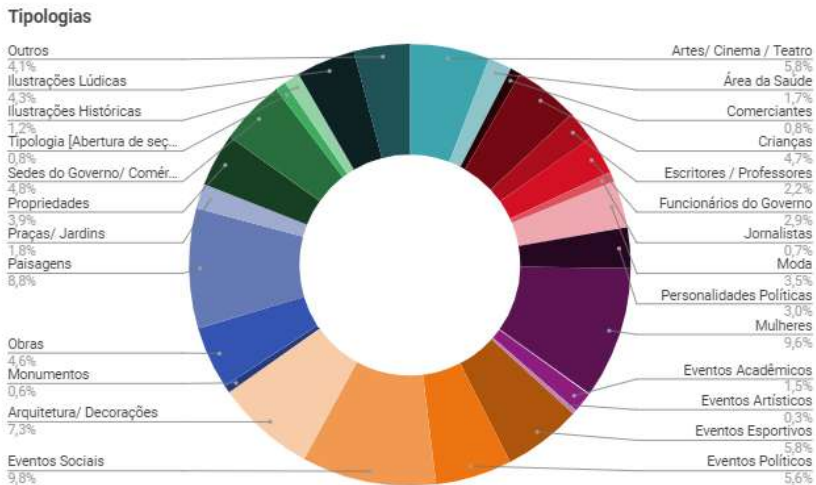
Therefore, we can state that the trial period of the datasheet was of extreme importance for the optimal construction of the FII, since only after its actual use we could be sure that the suggested variables would actually meet the researcher's needs and the particular features of the collection. Even though several tests were performed, some small contingencies and improbable responses appeared in the completion phase, which were corrected directly in the answer sheet. It is of utmost importance to zero the spreadsheet after the tests, so that it is to stop it from being unconfigured and does not bear traces of unsuitable answers which could be mixed with the new results. The option to unlink the form and choose a new path for responses is available in the Google Forms settings.

GENERATION OF RESULTS

All the data was now available, organized, sorted and added up, so we could straightforwardly start generating results. We were able to create charts that allowed us to observe the results in a clear and didactic way.


Picture 19: Picture of the data tabulation spreadsheet of FII with the adding up line at the end.


Picture 20: Example of a chart automatically created by Excel in relation to Typologies found in the magazine.

Due to the high number of collected data, the use of filters and the digitalization of the results allows crossing the data in a more agile way, enabling new queries whenever necessary. For data generation, we used Excel features to create pivot tables, thus obtaining subordinate tables to compare specific data. This feature also allows the creation of dynamic charts, which update automatically when necessary to enter or correct information, providing a more simplified view of the results. Charts and pivot tables also provided us with information on different outputs, such as real numbers and percentages, tailoring their results to the requirements of the research.
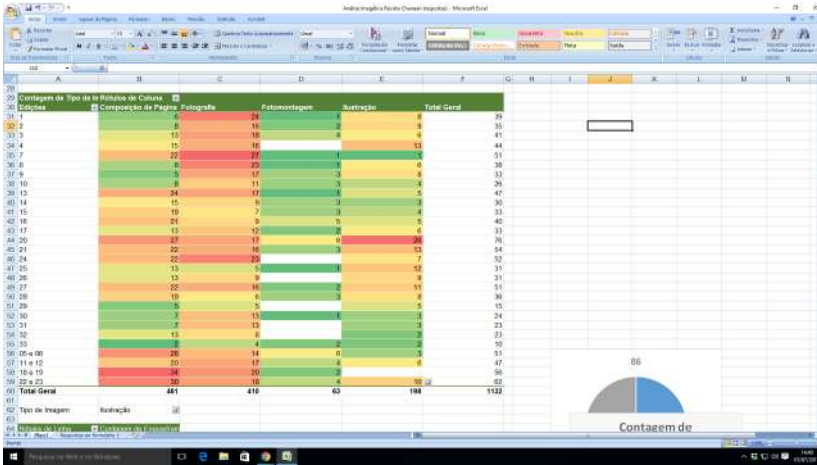
Picture 21: Example of a dynamic spreadsheet created to compare the most recurring types of images in each issue of the magazine through numbers and conditional formatting (this indicates with visual aids the variation of values, herein using colours).
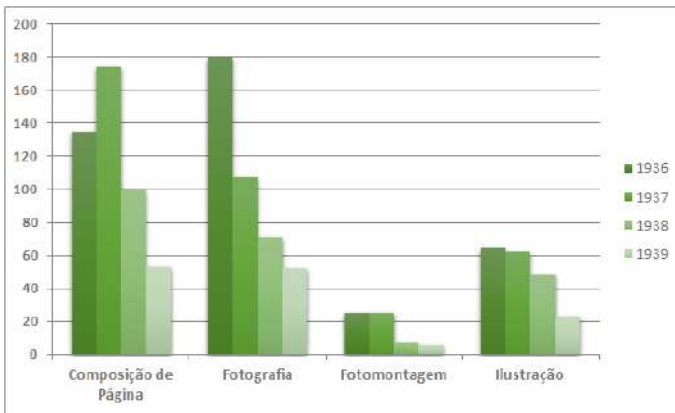
Picture 22: Example of a dynamic bar chart designed to compare the most common types of images during each year of the magazine.

With the results, it is possible to begin developing infographics that will help displaying the results according to the type of information the researcher intends to provide.

CONCLUSIONS

The elaboration of datasheets, the data analysis and the generation of results turn researchers into information designers, because they select and organize information (Wilbur and Burke, 1998) with the aim of creating records and ensure efficiency in scientific research.

The datasheet for the analysis of printed images was created after a literature review on the possible approaches to this topic. The decisions on choosing the variables that would be included in the analysis were made based on the images of Chanaan magazine, but the collection tool was assembled to be as comprehensive as possible. The researcher has the freedom to shape the variables and their possibilities according to the needs of the studied print. The better the researcher knows the collection he/she is working on and performs tests, the better the FII will work.

The digital FII has proved to be efficient for researches involving a large amount of data, since the digital template can be designed to include data in different ways, according to the needs of each technical variable to be measured. It also accelerated the process through automatic tabulation of the data in an editable spreadsheet, generating results that are more reliable. The automatic counting eliminates the possibility of errors that can occur in a manual tabulation. It also streamlines and allows comparisons between different variables and the possibility of visualizing the behaviour of a certain data throughout the issues of the printed material under study.

The data analysis sheet, the data tabulation spreadsheet and the analyses charts are products developed by the researcher whose purpose is to ensure that all types of information are accessible and usable at a first moment by the research group, and subsequently by the entire scientific community. Some specialists assign such commitment with accessibility and effectiveness of information from a general perspective to information designers (Sless, 1992; Redish, 2000).

The data results allow one to confirm or refute impressions on the construction of images in a certain collection, validating conclusions that will be considered in the analysis of all of its elements, for cutting it can result in biased information that does not correspond with reality. Studying and retrieving graphic tendencies of an era or period through the investigation of its collection can highlight how the aesthetics of the images were established, and to what extent the then available technologies allowed experimentation, enlightening if the graphic

patterns followed a style or simply looked for solutions with the available resources.

We can conclude that the datasheet built to support researches focused on analyses of archives of images present the necessary variables to build an imagery profile of the collection, enabling results of isolated or compared analyses of one or more archives.

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