LEARNING GEOGRAPHY WITH UNDERGROUND MAPS

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Abstract

Underground maps have become so popular and widespread that they have transcended the function for which they were created about a century ago. These maps fulfill faithfully the duty of guiding us across the metropolitan transport network. In addition, they have become iconic elements, merchandising and brand images of many of these cities. In this paper, we propose the use of these maps in order to be applied as a teaching methodology with a dual purpose; on the one hand, for learning about cartographic design and, on the other hand, as a tool for understanding the territory through cognitive maps.

Keywords: Underground maps, cartographic design, geography education, cognition maps.

1. INTRODUCTION

Nowadays, our lives are swamped with a flood of information which we must collect, organise and process. The shift from analog to digital media has meant an overwhelming amount of stimuli input, which, in turn, has made image become more relevant than ever before. In this way, image appears as both an intuitive and compact element, due to its huge ability to synthesize.

Cartography deals with a typology of images depicting an area of the territory and has been closely linked with Geography since its origins. Like photographs, infographics, graphs and all sorts of images, cartography has reached millions of users through the Internet and mobile devices. Demand and use of geographic information is on the increase, as well as a higher interest in watching and understanding the territory. There is also a wide variety of cartographic typologies, be it basic, thematic, reliable, such as ortophotos, or more abstract ones like cartograms, mind maps or choremes. Among all of these, it was London's underground map that meant a remarkable breakthrough when released back in the 1930s, currently remaining as useful and fresh as at that time. Such mapping typology has clearly gone beyond the purpose for which it was originally designed. Besides still being the best way to find your way around by metropolitan transport in lots of cities all over the world, it offers a large number of opportunities, being education just one of them. This study introduces a number of possible teaching approaches to a cartographic typology which is recognized by all. The main aim of the article involves showing an innovative way of customising learning about the territory by means of cartography and the perception which students have of a city, of a region or even of an idea, both in their personal mind picture and in the way in which they represent such elements. The study also tries to explore the potential communication and creative ability of cartographic design by linking it to more personal and subjective geographic trends such as

Geography of Perception and Choreme Geography. The same exercise, the same style, the same philosophy and rather different results, customised after work developed over the past four years. Work with underground maps is a part of the set of activities to be completed by students taking the subject named "Perception and Interpretation of Geographic Reality" within the Degree in Humanities and Social Studies at University of Castilla-La Mancha, Campus of Albacete. The student acquires knowledge of cartography and geography through a number of paradigms. Qualitative and quantitative methodologies and tools such as GIS (Geographic Information Systems) are used in this subject. All the activities make students become familiar with broader understanding of the territory through projects where multidisciplinary knowledge acquired so far is put into practice, combining Art, History, Literature and, of course, Geography.

2. CUSTOMISATION OF GEOGRAPHY LEARNING

Geography became established as an academic discipline in the mid XIXth century. Its birth ran alongside other disciplines such as History, linked to thriving nationalist feelings. Encyclopedic knowledge was chosen to enhance a number of areas, sites, borders and facts. History and past are believed, on socio-cultural grounds, to be synonyms, yet actually it is the past that constitutes the object of History. It is absolutely impossible to know all the past of all people. History means construction and selection of the past. Something similar occurs in Geography for the polysemous terms "geography" and "territory". Mastering History does not mean learning facts and dates by heart. Mastering Geography does not mean learning places and capitals by heart, either. Knowing the main elements of territory is relevant, yet it is utterly crucial to understand the interwoven relationships that arise between such elements. Encyclopedic knowledge causes the teacher or lecturer to become a mere broadcaster of information, information that is already available on the Internet. Barely enumerating place names and not generating relationships and construction means nothing but impoverishing knowledge and critical capacity of students, besides devaluating the discipline of Geography within society and everyday life, not to mention the effect on the continuous revisions of the academic curriculum.

Epistemological and methodological ups and downs have been recurrent throughout the history of the Geography discipline. Continuous changes of paradigm and object of study have led to disturbing lack of common ground among geographers themselves, their research or even a minimum of consensus on what must be studied and how it must be studied. Currently, inconsistency exists between the geographic knowledge in the classroom and the practical demands of society. The knowledge that is taught is hardly applicable to everyday life, starting from encyclopedic learning, more characteristic of past centuries than of the present background. Ever-increasing access to the Internet, together with the extended use of smart devices which enable us to be online almost everywhere results in immediate availability of an enormous range of resources. Therefore, the current century's challenge deals with information management rather than access to information, as was the case previously: a revolution which has turned out to be far more significant than printing or television. A major change which has been due to the shift in formats, media and directionality of information (Pons, A. 2011: 20).

Geography does not remain oblivious to the changes mentioned before. The territory is analysed from multiple points of view. Nevertheless, the territory and its perception become unmanageable, even today, with such an enormous array of resources supplied by geographic information technologies. Consequently, it is necessary that the student becomes able to analyse their own territory and to draw their own conclusions. Critical thinking needs to be fostered in order to be transformed into suitable knowledge; geography which is reflective, practical and customised regarding interaction between the individual and their way of

approaching the territory. Substantive content learning and strategic relationships must be taken into consideration, knowledge and skills being acquired from case study (as up-to-date as possible). More and more scholars are discussing replacing memory-based geography with a more reflective approach to it (De Miguel, R.:2013:24). Geography and geographic data go far beyond the classroom and the labs and increasingly become part of our lives. Recent examples can be found that have provoked gamification of the territory through worldwide expansion of apps such as Pokemon Go1, based on device tracking. Geography is a living science which should allow interpretation and understanding of the territory in an appealing way. Spatial information is relevant due to the fact that "almost everything that happens somewhere" (Longley et al. 2011). Geography is required to be consistent with current needs and social demands by enhancing its everyday side and, at the same time, by maintaining its scientific and methodological rigour.

Geography fits practical learning; it can become key to instilling curiosity and willingness to learn rather than being aware of the concepts themselves. Concern for discovery and research may lead to activation of students' autonomous learning as well as to overcoming the academic purpose: lifelong learning. Relationship with the territory and, for that matter, with geography, will accompany us throughout our whole lives.

2.1 Cartographic design and customised learning

The development of technological issues in which we are currently engaged has transformed us into consumers of information technology, which includes elements ranging from increasing use of electronic devices (laptops, tablet, smartphones) to all kinds of contents and interactions through 2.0 web, shifting from a sender-receiver flow to a bi-directional one where everyone can be either sender or receiver. Loads of easy-to-read and fast-to-understand information is consumed, given the flood of input which we are continuously receiving. The image, therefore, gains importance due to both so-called smart devices and the web. Information is more and more visual, with graphs, infographics and cartography filling websites and social networks-Image grabs attention and synthesise information in a more effective way than text does. It conveys a lot in little time and leaves an important memory (Resiberg, D. and Heuer, F. 2005:55). Technically speaking, everything is image, even the text seen from the interface on a screen.

Geography is mainly a visual science of the territory (Scholtmann, A. and Miggelbrink, J. 2009). It feeds off infinite typologies of images for its multiple purposes. Among all these, it is cartography that accounts for higher territorial aim. They have gone hand in hand for centuries in order to teach, analyse and explain all the spatial processes that occur in our planet. Not only does cartography enable us to depict the area surrounding us but also to imagine, create and design the perception that we have of such area. Curiosity is also fostered and spatial information is transformed into useful knowledge, applicable to the real world. Cartography has been substantially affected by the so-called Geographic Information Technologies (GIT) – satellite images, Global Positioning Systems (GPS), Geographic Information Systems (GIS), visualizers, mash up tools and a large number of improvements have resulted in the number of people making maps and using them being higher than ever before (Crampton, J.W. 2010:11). We face a society which is globalized, interconnected, virtual and mobile, which demands and consumes a higher amount of geo-spatial information, in general, and a greater number of maps, in particular. Interaction between people and the territory has significantly increased through maps and all kinds of tools as implemented in apps and mobile devices. Democratisation of access to cartography makes it possible for people with basic IT knowledge be able to depict visual information in a somewhat apparent way, systemised, homogeneous, "fordian". A lot of this cartography is underused, owing to users' lack of analytical ability and

to existing software's scarce capacity for cartography design. This leads to massive presence of low-quality and inaccurate maps. Plenty of "cartorrhea" exists on the web (Capel, h 2009). The tool is prioritised over reflection and users are more concerned about "clicking" on the software than to understand the outcome. Debate is ironically put forward about whether or not SIG has killed cartography (Vanoutrive, T. 2010).

In the quantitative paradigm sponsored by the giant technological development, confusion may be found as for the accuracy which geo-referenced maps boast. What is depicted is granted the principle of accuracy. We tend to believe in a cartographic positivism where cartography is objective, neutral and independent (Harley, J.B. 2005:25). Geographic Information Technology has boosted this perception. However, it is well known that the representation of the Earth's surface from s spherical body to a flat one involves assuming a distortion (Peters, A. 1991:7). A map is not a territory but an abstraction of the territory. Geographic space is accessible and specific. Perception of space ignores the concept of infinite and, as such perception, it is not homogeneity but diversity that exists. Sensorial space is anisotropic and space is linked to conscience (Ortega, H. 2000:357). This fact allows it to be cartographed, enabling us to locate phenomena and mapping the components of space.

Locational component is key to geography as well as in many other disciplines but, even more important are relationships established between its elements, as stated by Von Thünen, Christaller or the economist François Perroux. "Although every point in space can be located, what matters is its location with reference to a whole of which it is a part" (Dolfus, O. 1982:8). The cartographic representation of elements, as well as their topology, may be more or less accurate, becoming even a graph or a simplified geometrization of reality. Several authors claim that, on some occasions, freehand sketches or maps are more useful that computer-aided ones (Barkowski, T. & Freksa, C. 1997:348; Agrawala, M. et al.: 2011:64). This kind of maps is more and more disused, facing countless diversity of technological apps. However, they are more intuitive, user-friendly and of high pedagogic effectiveness.

Cartography has undeniably an educative and pedagogic side (Jerez, O. 2006). Within map typology, perceptual maps are a part of analysis methods of Geography of Perception. Research done by this geographic trend has ranged from the psychological paradigms in the earlier works of the trend, led by urban planner Lynch and his vision of the city (Lynch, D. 1969) to sociological principles which have approached geography (Vara, J.L. 2008). They have been less successful than others which have been more largely sheltered by late 20th century's technological development, one of which higher values being how easy it makes geography popular with students by means of practical and entertaining activities where they feel they are the protagonist. Such activities allow unwavering knowledge of our immediate background in a practical and constructivist way, having the further advantage of a diverse, easy-to-implement methodology. Opponents argue about complicated systematisation and difficulty to reach homogeneous results.

Several proposals deal with learning through conceptual maps, which allows structuring information from relationships between perceived elements (Escobar, F.J.:1992; Boira, J.V. et Al: 1994; Gieseking, J., J. 2013; Tversky, B. et Al, 2006; Vara, J.L. 2010; Rodríguez, Mª A. 2014; Berthier, A. 2006). The relevance has neither to do with the datum itself nor even with its geometrical location but, rather than that, with its interaction with neighbouring elements and with how such elements are structured and laid out. Major teaching interest arises because it does research into a close, down-to-earth reality. Links are constantly being created, at times in a spontaneous way, as a habit. This layout of our spatial decisions may help optimise them and improve our time management. Time is a scarce resource, neither storable nor extensible, which make spatial decisions become key cornerstones (Díaz, M.A. 15:1992).

The other theoretical methodological support on which this teaching practice is based on, besides Geography of Perception, is Chorematics and the so-called choreme (Brunet, R. 1987;

1990). Choreme is a neologism of Greek origin χώρα (Khora: space, territory, place) to which the suffix "ma" has been added (like "phonema"), imported from the French term "chorème". A word still unadmitted to main European languages, it is to some extent a contribution of geography (Martí-Brugueras, MªM. 1975:132). The term has a double meaning: it is defined as the elementary unit of a model of spatial organization and, at the same time, the graphic expression of such unit (Fernández, F. 1998). The language of choremes is closely linked to other graphic languages resulting from simplification in mapping through points, lines, areas and network. Its value does not involve a graphic method but a far more complex process including prior in-depth analysis. The definition leads to assuming that the territory has an inner structure which can be analysed and depicted. The idea generated a paradigm shift in geographic science (Ferras, R. 1993). Prior knowledge of reality to be cartographed requires establishing links between reality and its representation. Ever since it appeared in the so-called New French Regional Geography, it has received permanent criticism, especially from French scholars. Ives Lacoste, just to mention one of them, criticized its simplification, graphic manipulation, pseudo-objectivism, and, ultimately, the scientific illusion on which it is founded (García, J. 1998:6). Perhaps it is these objections, or the lack of linking to systematisation enabled by new technologies that have caused that the development of choreme has been lower than that of Perception Geography. There has been, though, not little research that has been done based on these theories (Arreghini, L. 1996; Portugal, J.A. 1996; Klippel, A. 2011; Fatto, V. 2009; Reimer, A. and Fohringer, J. 2010).

Chorematics and perception are coincident at providing a mind map of the territory. In one of them, the mental structure arises from a perception whereas, in the other one, it stems from analysis. Both have cartographic design as their core element and both are founded in qualitative analysis, completely different from cartograms, which are nearer to quantitative concepts like choropleth maps, widely spread through Geographic Information Systems. Mind maps and choreme maps are a part of the corpus of schematic maps. Among them, those inspired by London underground map can be included (Reimer, A. and Fohringer, J. 2010:6). Elaboration of perceptual maps, sketches and choreme is directly linked to humanist geography.

Geography of Perception and Chorematics are two geographic trends belonging to a theory where subjectivity and personal views are prioritised over other principles. In some cases, it is blamed for lack of rigour and homogeneity of results; in some others, it lacks digital development, which may have been the cause of its poor implementation by the geographic community. Establishing Geographic Information Technologies (GIT) fosters the use of quantitative methodologies and, consequently, improving students' technological skills. Nevertheless, the use of GITs is simplifying and unifying cartographic learning methods and outcome. Similarly, the use of navigation tools reduces the choice of routes which are offered through the territory for the sake of a Euclidean paradigm or of minimum time spent, which inevitably involves impoverishing our permanent learning about the territory. New technological tools are beginning to appear revisiting other postulates' predetermined optimization2 (Quercia, D. et Al. 2014; 2015). Technology is an element which currently fosters learning about the territory; it does not necessarily have to mean becoming an indispensable element, though. One learns through action, autonomously, critically, functionally and constructively. The work presented herein focuses on a different way, individualized, practical and active, towards learning geography and cartography.

Applicability of theoretical knowledge is an increasingly higher requirement within the academic field, both for Universities enforcing adaptation to European framework (Plan Bolonia)3 and for students themselves, in particular within the field of Humanities (Pérez, M. R. et Al. 2013; Esteves, M. H. and Rocha, J. 2015). At the International Geographic Union (Krakow, 2014) and in the International Charter of Geography Education (Beijing Assembly,

2016) the importance of geographic learning was brought to light. (Van der Schee, J. 2014; IGU. 2016). Both refer to the idea that geographic education must be a lesson on how to think geographically, a way to watch and understand the world surrounding us. "*Building on people's own experiences, learning geography helps them to formulate questions, develop their intellectual skills and respond to issues affecting their lives.*"

2.2 Albacete underground map

In 1933, electrical engineer Harry Beck presented his new underground map inspired by contemporary electric circuits. He copied the metropolitan transportation system to that structure and sketched it through geometric simplification, giving priority to strictly necessary information (Haddadi, H. 2010). The underground lines turned into 45 º and 90 º lines, and the stations into interconnected dots (Grima, C. and Berry, R. 2012). Underground maps are synthetic representations of the main figures and their relationship. The abstraction and simplification of the metropolitan transportation network itineraries has enabled a fast and massive implementation of this way of representation of facts in the territory, stations and their relationships: underground lines. The result was a map of quick and easy understanding for users, though not lacking a few distortions (Liu, Z., Li, Z. 2016). This image is optimal, and even turns iconic (Degani, A. 2013). This is one of the most representative examples of the universality of cartographic language. It has been implemented with few variations in basically every metropolitan transportation system (Pérez, J. 2009). It has been used to represent other transportation and supply lines (Guo, Z. 2011). The success of this underground map transcends the purpose for which it was created. It is an icon and picture in the promotional merchandising of their touristic image, being London the most commendable (Merrill, S. 2013). Many cities set their prevalence in the city system reinforcing the image of their city through its underground map and a transportation typology that only exists in cities of a certain size.

This academic activity began with a theoretical session about the origins and dissemination of the underground map4. A significant amount of cartographies about the metro maps of many cities in the world were compiled and reviewed. These materials can be found online on the social network Pinterest, on a board named "Mapas de metro"5. Formats, aesthetical compositions and finishing might vary, but in almost every picture reminiscences from Beck's design can be seen. This teaching material is completed with several manuals about cartographic design (Bertin, J. 2005) and a YouTube playlist about cartographic design6. All the teaching materials can be found online7. After these incentives and resources, the students were presented with a few simple questions. Can Beck's design be improved? Is it applicable to new contents? Can we create and design a representation that improves what we have seen so far? When teaching this content, students may be asked to elaborate their answers. In this case, the students were asked to outline their own map. This exercise aimed to explore the students' different creative –as well as cartographic design-oriented- possibilities.

In the first year, the outlining of the Albacete underground map task was given to the students. Albacete is the city where this subject is being taught and where the students are based in. The following exercises varied in topic and location. The task given in the first year has a lot to do with the geography of perception, while in the following years it leaned more towards Chorematics in an effort to represent the complexity of a certain topic through its regularities (Brunet, R. 1987)

The underground map of the city of Albacete is an exercise loaded with subjectivity in which each student writes their own proposal about the city they live in. The city is located on the eastern side of the south sub plateau in the Iberian Peninsula. It is halfway between the centre of the peninsula and the east. It belongs to the Autonomous Region of Castilla La Mancha,

being its most populated city. It is a mid-sized city at 172 121 inhabitants as of January 20158 and it has no metropolitan transportation network, as it is not really needed given its size. In this exercise students can toy with their creativity and they are allowed to break the city's scale, to over size it and plot its most iconic locations in a creative and appealing fashion. Freedom is total, which allows for a melting pot of heterogeneous answers, both creative and personal. The design, the number of lines and stations and their connections are fundamental in the network. The finish and communicative ability are significant with special attention to detail and finish of the representation. The student's own experience is shown in the shaping of the exercise. It gives value to geography knowledge that has been shelved due to its routine character and, implicitly, to their everyday activity, reflected in an organized representation halfway between a mind map and a perceptual map.

The perception of the urban structure of the city through an underground network can be interpreted as the nodes and landmarks that around the mid 1900's Kevin Lynch drew up in his image of the city and his studies for the cities of Boston, Los Angeles and New Jersey (Lynch, K. 1960). Every single station can be understood as a landmark or node according to Lynch's terminology. They are conceptual anchor points of our city, be it as places on a singular location that allow us to be seen and recognized, be it as strategic connections to organize the transit in our city. The location of a station provides some added value to the depicted area. The allocation of the stops in the map and its concentration or dispersion allows us to guess what the central areas of the city are, with an increase in activities of a certain nature: services, shops, businesses, etc. It allows for a first approach to the territorial hierarchy of the cities (Wolff, A.2007). Each student decides on the style and design they will present, the number of lines, their length, the number of stations, their location and the connections between them. In many cases it is difficult to determine their geometrical location since the abstraction from the representation does not include a background cartographic base. Besides, each of them gives it the place-name they consider most suitable to said station, newly providing the area with a subjective value.

Simplification drives out the superfluous and allows for a clearer observation of what is peremptory. The analysis of underground maps in the distribution of their stations is interesting, and at the same time it poses a creative activity, a visualization of the perception the person holds over the city they are representing. It is likely that the transposition of this exercise to cities that already have a metro network will be biased by the already existing metro network. In our case there is no such influence. The absence of existing references lets us imagine and increase the ability to decide which stops and which places are the most important inside the city. At first, such exercise could have seemed ridiculous, since it was asked of the students that they design a map for an infrastructure that is unnecessary in this city due to its characteristics, but it has become a potential value for design as well as to understand the interpretation that each student has of their own city. We are talking about an individual learning process, in which each student develops their own capabilities from their existing knowledge. Bringing together all the cognitive maps allows us to get a group idea of the city and appreciate the different anthropocentric approaches that these maps often show. The project was presented in an exhibition named "Mapas del metro de Albacete: cartografías utópicas" ("Albacete underground map: utopic cartography") (García, J.A. 2013).

In the following years, the same exercise was repeated as part of the tasks the students need to complete in order to pass the subject. It is necessary to understand that the creativity of the results would be hindered if the following year they were given a similar exercise. The maps of their classmates from previous years would be their first examples. It was decided then that the students would be given an assignment with a different topic to portrait, following the same style of the underground maps of Castilla La Mancha. The representation would stir away from the geography of perception and getting closer to Chorematics. The topics were very different

in order to have as few students as possible working on the same topic. The need for the students to compare their results to their own previous results as well as the outcome and mastery of the cartographic technique is encouraged through the whole subject, from the first of the exercises to the last in the four-month term. Comparisons must be of individual nature and not between students, favoring the creative freedom and diminishing the influences of pre-established patterns. Some examples of the assigned topics make reference to protected areas, gastronomy, road systems, historical and artistic patrimony… It should be remembered that this subject is a part of the curriculum of Humanities and Social Studies and the students have a melting pot of subjects such as Arts, History, Philosophy, Literature, as well as Geography. The choice in topics is related not only to geographic concepts but to the multidisciplinary nature of the environment the students are being trained in. The assignment strengthens the way to understand, assess and learn from oneself. They are autonomous in the search for information and its prioritizing and selection. It is important that they make their own decisions. (Vegas, E.J. 2009:2). Once all the necessary information is found, it should be represented by following the same pattern, the underground map style. This allowed us to come up with common elements for analysis. The student observes, assesses, understands, maps, designs and represents in order to create a new individual reality. Each map is a unique perception of the same area from some common design precepts. They are unique in what has been represented as well as the way it has been represented.

In the following year, 2015, the assignment was given again. In this case, only the administrative context changed. Students were assigned to create a map of the thematic underground of Spain. The topics were very similar but by changing the area of study, the amount of information available for each topic was substantially modified. Again, we are left with a new exercise of prioritizing and selection of the information. Finally, in this year 2016, a new assignment has been given and ranked as highly valued in the surveys conducted at the end of the year about the assignments. In this case, we went a step beyond and total freedom was given when it came to the topic and the environment of the representation. The result created a complex variety of topics with topics of students' own interest taken from books, television shows and video games. Their motivation increased considerably.

3. CONCLUSIONS

For a long time, the mechanisms of the education system have experienced different ways, methods and strategies in which the student acquired and repeated said knowledge and procedures. It is not enough anymore. The digital era and the society of knowledge have changed the availability and use of information. It is necessary to think in a creative manner with a productive thinking instead of a reproductive one. This creative thinking produces talent that arises when the necessary conditions are present. It is necessary to create a suitable environment that promotes creativity and free thinking, without fear of mistakes or assessment patterns.

This article offers a teaching proposal in which the student develops their spatial analysis abilities, their area perception and their creative capabilities. The aesthetics designed by Harry Beck shows its consistency and ability in the most diverse applications. The map of the underground maps presents the information through personal experiences and background of the individuals and their area. Each student's mental image goes through screening in the typology of underground maps in order to obtain unique results in the arrangement of the same area. Territorial information is built up on their personal experiences and through the relations between the individuals and their environment. There is a rediscovering of our closest environment, giving space a hierarchy through the design of the network and its stations. The typology of underground maps allows for not only organizing space, but also time as

organization of diachronic contents from dots and lines interconnected through the creativity and individual experiences of each student.

This exercise, in its multiple aspects, wants to use the underground map as a teaching tool encouraging design and creativity through cartographic design. At the same time, it explores the analysis of variable distribution, perceptual in the case of the city underground map, and thematic in the following examples. The exercise gives value to the possibilities that the Geography of Perception and Chorematics give through the structuration of a variable in an area. It is an eminently visual exercise, in which the picture plays an imperative role.

The underground maps in particular, and the subjective cartographies in general, give the student an approach to the understanding of a certain area, quotidian geography and our constant relationship with an area. It presents undeniable advantages:

- Identifies the basic elements of cartographic design.
- Reflects on the possibilities of visual language and a way to prioritize and present information.
- Shows the importance of establishing a hierarchy and arrange information through design and creativity.
- Offers the possibility of teaching geography in a multidisciplinary way.
- Includes human perception as a variable and mediator in the teaching/learning process.
- Customizes learning increasing motivation and positive attitudes towards an active learning of the relations between elements of a certain area.

This type of cartographies has many detractors. Criticism referred to the lack of rigor and excessive generalization is more focused on the cartographic result than in the process itself. In our case, some of such criticism is considered acceptable. Many of the presented maps favour the design and visual aspect of the representation over the functionality and structuration of the contents. This is due, fundamentally, to the fact that it is this, and nothing else, that was the goal of the assignment. Cartography is not an end on itself. It is but a means to allow, in the one hand, to explore the creative capabilities that cartographic design has in its most artistic side, and on the other hand, to analyze, organize and manage information with spatial variability. The knowledge and use of visual language, especially cartographic language, linked to IT (Information Technology) shows a wide variety of interesting possibilities for the humanistic profile of our undergraduates. I cannot but remember these words by Eduardo Galeano, in relation to the importance of the journey and not so much the destination. "Utopia lies in the horizon. I take two steps closer, she moves two steps away and the horizon gets ten steps further away. So what's the point of utopia? That is the point: to keep walking." This utopia has served to walk through unimaginable environments that bring impressive results and still has a double reading, both from the form and the background of the task performed. From the form, we get visual results in which design, imagination and creativity of the individual take precedence over assessments and homogenous assignments for all the students. From the background, we can perform an analysis of the Geography of Perception, Chorematics and Graph Theory.

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[4] http://es.slideshare.net/JuanAntonioGarciaGonzlez/diseo-cartogrfico-mapos-metro-2014

[5] http://pinterest.com/geografiando/mapos-de-metro/

[6] http://www.youtube.com/playlist?list=PLNYev5GGl3wzwRsdtJv0KHtsN85FRaSEpwww.ine.es

[7] All teaching materials used in class are of free use for the students and everybody that wishes to make use of them through the PLE (Personal Learning Environment) under the name "Geografiando en las nubes ;-)"

[8] Source: Census 2015. INE (Census Bureau)