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"SIGECAH" AS A TOOL FOR THE COLLABORATIVE LEARNING OF SOCIAL SCIENCES IN ANDALUSIAN SECONDARY SCHOOLS

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Abstract

Almost a decade ago, as a result of the initiative promoted by the researcher Laura García Juan, the project SIGECAH (Historical Cadastre Managing System) was born with the aim of improving the analysis of geohistorical sources from cadastral documentation, firstly in Spain, and later taking another geographical scope. Its development and efficiency have diversified it inside the educational and research sector due to its digital platform. In order to make knowledge accessible and to turn students into active agents inside the classrooms of Andalusian Secondary Schools, we present an open didactical proposal for the Social Sciences: Geography and History. Thereby, SIGECAH does not only work as a tool for the treatment of the geohistorical sources and its cartographic transformation thanks to the Geographic Information System, furthermore, because of collaborative learning, teachers and pupils can join the project from their centres of Secondary Education, sharing information and researching about the changes in different places of the Andalusian territory.

Keywords: *SIGECAH, collaborative learning, Geohistorical sources, historical cadastre, Secondary schools.*

1. INTRODUCTION

Since 2007, the research group headed by Concepción Camarero Bullón from the Autonomous University of Madrid, within the framework of two research projects (i) has gathered several researchers, among them Laura García Juan, in a multidisciplinary way to work on the analysis and mapping processes from textual information drawn from different Spanish cadastres throughout the 18th century, mainly, the Cadastre of Ensenada (García Juan et al., 2008).

To respond to some problems that these sources present (lack of related cartography, centralised resources, didactical proposals, dissemination of results, and documental dispersion) and to improve their use in a context where the studies that use cadastral information are booming in the last few years (García Juan, 2015a), SIGECAH (Historical Cadastre Managing System) was born to offer the researchers' community a technical tool to use textual information and create an accurate cartography, thanks to the design of a reconstruction algorithm which provides succesful results (García Juan et al., 2014).

Thereby, developments and refinements of technical characteristics inside the project have allowed the creation of a collaborative website where anyone can participate

(http://sigecahweb.geo.uam.es/ensenada06/), according to their role as user, in the creation and visualization of the contents. Therefore, its didactic capacity increases exponentially in different fields of knowledge. In fact, its pedagogical skills and instructive capacity have been demonstrated both in the university and in other lower educational levels (García Juan, 2015b). Nevertheless, we have not specific studies about the development and application of SIGECAH as a tool for the collaborative learning of Social Sciences in Secondary Schools, taking into consideration the legislative characteristics and curriculum development of specific locations, in this case: Andalusia.

Consequently, this study tries to analyse the possibilities and strengths of the use and implementation of SIGECAH inside the classrooms of Andalusian centres of Secondary Education according to objectives, contents, and evaluation criteria published in the different educational regulations at national and autonomous level.

2. SIGECAH AS TOOL

As we have mentioned above, SIGECAH was born in 2007 with the main target of offering a free tool to transform the textual information gathered in the different historical cadastres, to then generate a precise cartography from the information in the above mentioned sources —which lack of mapping for several reasons— as well as to manage important volumes of information of different types likely to be georeferenced (García Juan et al., 2012).

Thus, we can assume that this system is based on modules and tools for the management and analysis of geohistorical sources. Nevertheless, SIGECAH has numerous virtual elements and for this reason we need to wonder: what does SIGECAH consist of? We are going to approach them from the information published by its creator and current developer, the researcher and teacher of the Autonomous University of Madrid, Laura García Juan (ii).

On the one hand, we find the website in a site hosted and constructed on the CMS (Content Manager System) Joomla. Inside this free software, an interface is divided into three layers*: information access* (where the information is housed thanks to the databases MySQL and PostgreSQL*), business logic* (in charge of connecting the databases with the presentation layer thanks to the engine of the CMS and to the codified Script in PHP to manage the database PostgreSQL) and finally, *presentation* (entrusted to present the information to the user and to interact with the system according to the role assigned to every user). Considering the importance of the role of every user for our study, it is essential to know the permissions that they possess, as well as the different roles: *guests* (users who can only visualize the information offered to the public in general), *researchers* (they have permission to interact with the resident information in the database PostgreSQL that contains the information of historical cadastres -within this profile we have users who can consult the information and others that can also update or eliminate information as well as assign permissions for consultation on information from other researchers-), *administrators* (they can add new functionalities to the system, edit static parts: articles, news… making up the research team in charge of the project), *technical staff* (they control the area of the system which allows adding functionalities to the project, in addition to carrying out its maintenance) (García Juan, 2015a).

In addition to the different roles, it is necessary to emphasize the functionalities inside the web page, which are divided in two profiles: *free* (with general and research profile, where we can find the *didactics module* and the *social networks*), and *with log in* (where access is restricted and leads to the *management module* and to the *cartographic viewfinder).*

On the other hand, we find the relational database organized at present on two components: *Ensenada* and *GIS*. Thanks to the first one, we can identify different aspects (*cadastre individual, goods, geolocation*), through a few relational models and through the application of management that let us know the reality of the period thanks to one of the most important national geohistorical sources for the middle of the 18th century (Camarero Bullón, 2002a). On the other hand, the component *GIS* is fed mainly with property information and secondly with historical cartography. It is here where the information is likely to be georeferenced by means of raster layers and the vectorisation of the elements indicated in the textual source with points (for the location of place names and other elements), lines (for roads, rivers, etc.), and polygons (for plots and blocks) (García Juan, 2015a).

Therefore, and once the most important SIGECAH components have been detached, we will deal with the *didactics module*. At present, it is responsible for promoting and spreading the knowledge of geohistorical sources through resources and modules such as *Kunena*, *EasyBlog*, *Moodle*, as well as the social networks. The above mentioned *module* consists of three content levels: *general profile* (elementary and brief didactic content to reach all users), *didactics in the classroom* (it serves to groups of students of related fields, completed with practical examples and specialised resources), and *researcher* (where, in addition to the previous things, debate and exchange forums are included). However, as it is indicated in the next lines about SIGECAH, its intention is to enable the creation of knowledge to increase the project development and its contents (García Juan, 2015b).

3. COLLABORATIVE LEARNING OPPORTUNITIES AND THE IMPORTANCE OF THE SIG

The technological advance associated to the last decades has completely transformed aspects as education; for this reason, the development of *e-learning* (Curtis & Lawson, 2001) becomes outstanding thanks to the opportunities that it offers to students (active learning, flexibility, cost reduction, etc.), and the increase of the number of followers that it agglutinates every day (Dillenbourg, 2003). Hence, this tool is designed to be used at the network, giving pupils the main role within their learning process not only inside but also out of the classroom (Martínez Sánchez et al., 2001), in addition to didactic resources to understand and comprehend the spatial problems thanks to direct observation, data analysis and cartographic elements (Pagès, 1997).

Along with these progress, the development of the Geographical Information Systems (from now on SIG) and their application as an instrument in numerous fields of knowledge have extremely grown, causing a demand of specialists and being added to the academic curricula (Bosque Sendra, 1992). Thus, some tools used like didactical resources have done better and have been able to transform, thanks to their potential, the models of teaching-learning of the Social Sciences inside the classroom, whether at compulsory or higher education. All these elements lead us to choose collaborative learning as a model for teaching-learning to develop our project in a simultaneous way (in different classrooms and educational centres) thanks to the use of SIGECAH.

This project is included inside a new chapter in the *didactics module* (Figure 1). From here on, we get into an exclusive portal for education centres assigned to the project by means of the system *users/pass* that will allow the access both to students and teachers.

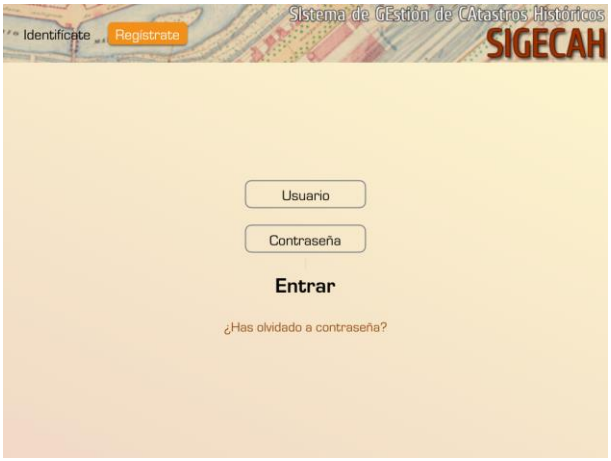

Figure 1. Access interface to the didactics module for the E.S.O pupils.

Considering the previously described roles, and taking into account the above mentioned classification, SIGECAH as a tool inside the classrooms of Obligatory Secondary Education will have several protagonists:

- *Technical staff:* in charge of the development and web maintenance of the platform, as well as interconnectivity with the database and PostgreSQL.
- *Administrators:* provide the material, examine the information sent by the teachers and classify it in a homogeneous way to be visualized by the users.
- *Teachers:* tutor the learning of pupils inside the classroom.
- *Students:* make research with the documents and insert the information to analyse it later in a comparative way.

Once the protagonists have been described, it is time to explain the learning process, but then it is advisable to clearly determine the targets, since the possibilities are numerous and they are going to define significantly the methodological approach to our activity (Figure 2).

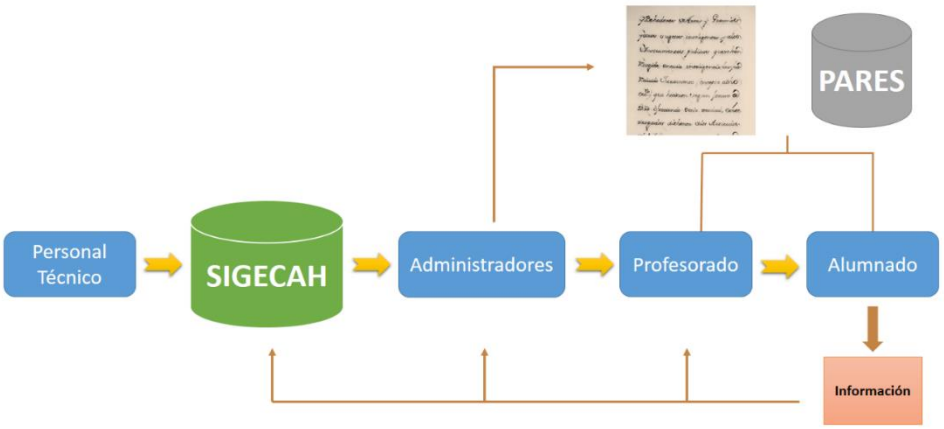

Figure 2. Roles and processes of working out inside SIGECAH.

As we have commented, the project focuses on the documents generated by the inquiry carried out between 1749 and 1756, impelled by the Marquess of Ensenada, key piece of a

deep fiscal reform that did not eventually see the light (iii). It is important to take into consideration that, when speaking about the Cadastre of Ensenada, we are referring to a complex documentary set, with documents at different territorial levels. Therefore, we will only use a part of it, in particular, the answers given to a questionaire with 40 questions, or *Respuestas Generales* (iv), also *Libros de lo Real* (v) and *Libros de los Cabezas de Casa* (vi), both for laypersons and ecclesiastics (Camarero Bullón, 2012).

Thus, we must take into account that every type of documentation requires different treatments and methodologies inside the classroom, depending on diverse factors; for this reason, it is necessary to clarify their features to be able to choose correctly according to the set targets.

3.1 Respuestas Generales

They include the answers to an examination of 40 questions made by the council and experts from each and every town in the cadastre, slightly more than 15,000 (vii). The information they offer, in spite of being declared before experts made a revision on all the statements, brings to light a great deal of information about very different matters: law, farming, cattle, industry, demography, town-planning, geography, etc. This documentation supports a large part of our proposal for several essential reasons: it is digitised and can be consulted through the Portal of Spanish Archives (http://pares.mcu.es/Catastro/); and, on the other hand, it was carried out in the whole territory of the Crown of Castile, that is to say, from Gallicia to Andalusia and from Extremadura to Murcia, meaning that the whole Andalusian territory is cadastred. These motives let us create a collaborative work between all the centres of Secondary Education in Andalusia, in such a way that, through the portal, the results can be compared on different places and learn on diverse questions gathered within the national and autonomic educational legislation, as we will see further on.

Thanks to its results, the students will understand the geographical structure of the Andalusian territories, organized in four administrations: Kingdom of Seville, Kingdom of Granada, Kingdom of Jaen and province of Cordoba; the jurisdictional situation of the different towns in the middle of the 18th century, the royal, municipal and ecclesiastic tax system, the volume of population and its demographic and stratus structure, the economic activity (farming, craftwork, commerce...), the agricultural and stock production, the partition of plots, the price of farming products, the industrial facilities (flour mills, oil mills, gunpowder mills and paper mills...), fulling mills, foundries, etc., the service activities (doctors, pharmacists, bleeders, midwifes, teachers of the first letters and latinity, etc.), the urban real estate patrimony (haystacks, houses, palaces, etc.), the commerce, industries and offices, the number of vessels, the convents and monasteries, hospitals, in addition to the king's and the council's properties in the town, environmental aspects (hills, uncultivated lands, wetlands, etc.).

All this will be carried out through the platform by means of the templates designed for the insertion of the information contributed by *Respuestas Generales*, specifically, one for every question and a preliminary one to include the dates in which the examination was made and the members who were composing the commission that made it (Figure 3). For this purpose, a total of 41 modifiable files have been designed so that students can insert the information needed in every case.

Figure 3. User's interface for the information insertion from Respuestas Generales in the centres of Obligatory Secondary Education (ESO).

Once the property information has been introduced and saved, it directly goes to the SIGECAH database by means of an *SQL* or *shape file* where it remains stored for teachers to analyse, and later, for administrators to review before making it visible to all users (Figure 4).

No limit

	id_pueblo [PK] integer	Nombre del Término o Villa character varying	Fecha de comienzo o reanudación date	Fecha de finalización date	Lugar de reunión o realización character varying	Cargo dentro de la Comisión character varying	Nombre character varying
1	1	Valle de Abdalajis	1751-04-21			Juez Subdelegado	Don Manuel Fau
*							

Figure 4. Information insertion in PostgreSQL from Respuestas Generales.

Then, once the inclusion of all the information has been finished, it is possible to examine and compare it, giving as a result (in most of them), a few theme maps through PostGIS which let us understand the spatial distribution, typology and quantity of the examined factors, as for example, the variety of prices of the different farming products (Figure 5).

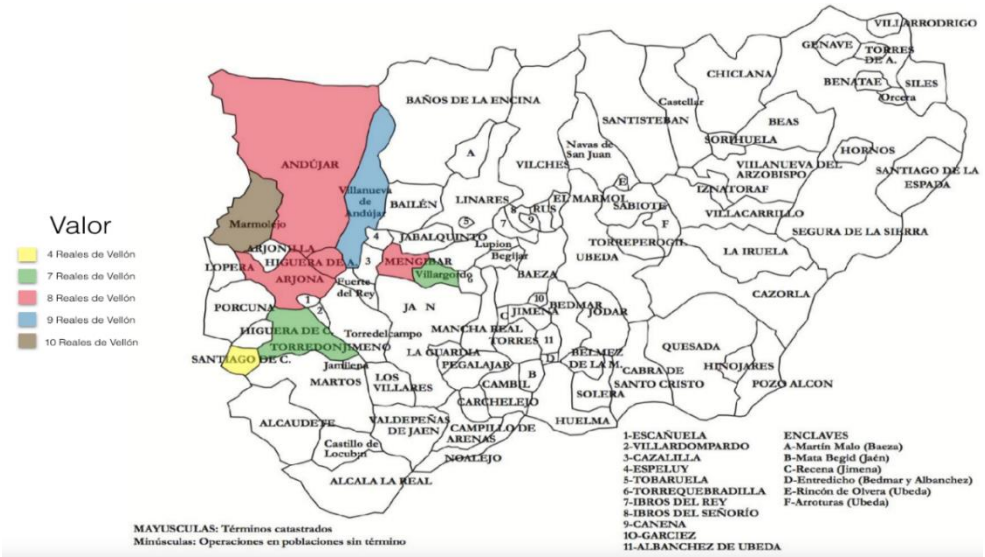

Figure 5. Price of the bushel of alverjones (Lupinus angustifolius) in the Kingdom of Jaen according to Respuestas Generales. Base cartography: Ferrer Rodríguez, A. Nieto Calmaestra J. A., Camarero Bullón, C. (2000:) La organización territorial de la provincia de Jaén, 1750-2000: permanencia y cambio, CT Catastro, 39, pp. 19-50.

It is true that this information only shows general aspects of the town, therefore it is very difficult to work with specific phenomena, like the geographical location of the farm plots or the partitions, for this type of information it is necessary to look at another cadastre document: *Libros de lo Real*.

3.2 Libro de lo Real, Raíz o Maestro

This documentation constitute, as Camarero Bullón states, the authentic cadastre database, as it gathers all the elements subject to fiscal regulation of each of the tax individuals. The above mentioned information is contained in the *Memorials*, once verified and, if it is necessary, corrected. Therefore, the owners' names, the houses, the lands and their shapes and dimensions, the cattle, the revenues and charges, etc. are detailed. All in all, we can check all the properties of each of them and their location, together with their value (average value of the harvest in case of the lands, value in revenue for the houses, etc.), which would be taken to calculate the tax base for the later exaction of the Unique Contribution in the town.

It is here where, with the help of cartographic recreation, we can create the spatial distribution of the territory knowing not only the number of houses, their location and size, but also, the number of plots that they possessed, the area in which they were, their size and margins. For this purpose, we will use PostgreSQL, with its extension PostGIS, with a prior analysis of the element and selection to determine the type of element to insert: *points* (for the place names), *lines* (for paths, streets, rivers, etc.), and *polygons* (for blocks and areas depending on the zone that we are working on) (García Juan et al, 2012).

Thus, we will be able to obtain a much richer local view than with the previous documentation. Nevertheless, unfortunately the loss and documentary destruction have made that numerous Andalusian municipalities are not provided with the copy of the above mentioned documents, for that reason, exploiting these documents in the classroom is more difficult; adding the difficulty of their consultation, because the whole set is not digitised at the disposal of the user in the network. On the whole, the local documentary set that was preserved in the provincial Accounting Offices of Revenue of the Kingdom of Seville (current provinces of Cadiz, Huelva and Seville) and in the province of Malaga has disappeared.

3.3 Libro de los Cabezas de Casas o Libro de Familias

Its denomination changes throughout the cadastred territory, and also the document is not so homogeneous as *Libros de lo Real*, since they did not all gather the demographic information with the same accuracy; for that reason we will find large differences within the Andalusian territory, comparing the ancient Kingdom of Jaen with other places. They are books that contain the demographic information of the town, separating secular from ecclesiastic families. Through them we can make thorough demographic studies that really help to understand the local population structure (Figure 6).

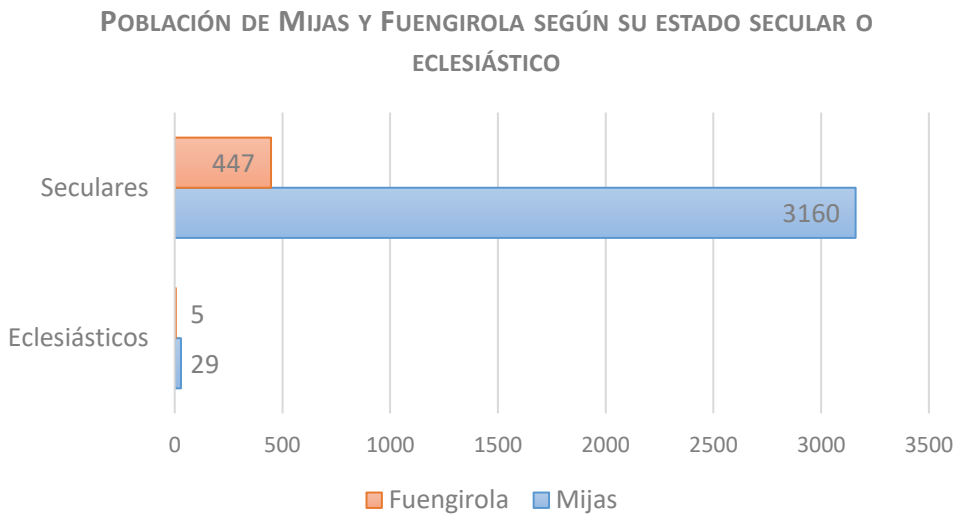

Figure 6. Population of Mijas and Fuengirola according to state: lay or ecclesiastic. Source: Aguilar Cuesta A., I., 2016. Seculares y eclesiásticos a través de los resúmenes del Libro de lo Raíz del Catastro de Ensenada, en VI Jornadas de Historia y Etnografía Villa de Mijas, Mijas.

It will be here where population pyramids will have an outstanding role, when documents give information about age -not always included- the study of the familiar composition, the structure of working population, or the type of settlement (concentrated, disperse, scattered, etc.). There are usually interesting activities here related to the genealogy of the pupils, since the coincidental surnames can be an inspiring element at the time of working inside the classroom.

The working method is very similar to the one employed with *Respuestas Generales*, nevertheless, for each of the neighbours a form will be filled which will include separate information corresponding to them (name, age, marital status, member of the secular or ecclesiastic state, profession, number of children, name, age and profession of them, etc.). This way the forms go on to the database, where they can be corrected by the teachers before being sent to the administrator for checking and publication (Figure 7).

Figure 7. Interface of Libro de los Cabezas de Casa of Cazorla where the information is inserted.

Later, it is possible, by means of the theme maps, to make a composition of the total number of people who were living in the different places, or classified by gender and age range. On the other hand, it is possible to analyse the ageing of the Andalusian population in a certain date and to verify, with other information from the National Institute of Statistics (http://www.ine.es/), the evolution, differences and similarities with the chosen historical time.

4. ONLY GEOGRAPHY? THE TOOL IN THE CURRICULAR ANDALUSIAN CONTEXT

So far we have seen the characteristics and functionality of the tool; nevertheless, we always must take into account the needs for the classroom according to the current legislation. Hence, we cannot forget the educational reality where this is going to be applied, specifically Andalusia.

At present, the Constitutional Law 8/2013, of December 9th, for the Improvement of Educational Quality supports the functioning of the secondary education at national level. Furthermore, Andalusia as an Autonomous Community, also has educational power clearly defined by Aragón Reyes (Aragón Reyes, 2013). This way, it is necessary to confirm the SIGECAH aptitude with the study plans where the curricular arrangement is included, to be more exact, inside the Order of July 14th, 2016, published in the Official Bulletin of Junta de Andalucia number 144 (viii).

One of the typical elements is the intention to offer fundamental components for later inclusion on the labour market or academic career in higher levels to all the students. Specifically, the Andalusian curriculum proposes an interdisciplinar treatment for the development of the basic skills. Nevertheless, educational innovation and research become a priority looking for the collaboration between teachers and new methodological applications, whose recommendations focus on the cross-curricular subjects, the teachers' role as advisers and promoters, the active implication of the students in their own learning, the stimulation of critical thinking and reflection, the research inside the classroom, the methods of compilation and analysis of information, the interactive strategies that allow the construction of knowledge and the use of communication technologies as integrated tools, are offered like methodological recommendations in the classroom. For that reason, SIGECAH stands out as a possible tool to be used thanks to its aptitude to agglutinate inside the classroom, being able to match the pupils' current needs and obeying the current regulation.

If we observe the curricular development of Geography and History as a general subject within the block of main subjects, its importance is remarkable inside the centres of Secondary Education. Out of all the detached targets, sixteen, we can completely or partially reach eleven, since we work with documents at an autonomic level. That is to say:

1. To conceptualize society as a complex system analyzing the interactions between the diverse elements of the human activity (political, economical, social and cultural), assessing through the study of important current difficulties the multifactorial nature of historical facts and how these contribute to the creation of collective and individual identities and to the role that men and women play in them.

2. To place in the space, to know and classify the constitutive elements of the Andalusian, Spanish, European and the world's geographical environment, comprehending the existing connections between these and the humanisation of the landscape and analyzing the political, social, economical, environmental consequences

that it has in the management of resources and making them aware on the need of the conservation of the environment.

3. To know and analyze the ways in which the human society transforms the environment, and in turn how the territory influences the organisation and identity of the above mentioned society, reflecting on the dangers that generates the intervention of man in the environment, giving special emphasis in the case of Andalusia.

4. To understand the geographical and geo-economical diversity of the world, Spain, Europe and Andalusia by means of the analysis, identification and location of their basic resources as well as the most important features of their geographical and human environment.

5. To acquire a global view of the History of Humanity and the place that Andalusia, Spain and Europe take in it, by means of the knowledge of the most important historical facts, social processes and existing interaction mechanisms between the first and the second ones, analyzing the interconnections between past and present and how Andalusia is projected in the present global society supported on its historical heritage.

6. To value and understand the existing cultural diversity in the world and in the historical roots and present of Andalucía, showing respect and tolerance for the diverse cultural events, as well as developing the skill of critical thinking with regard to them, and how these attitudes are a source of well-being and development and also the foundations of democratic citizenship.

8. To appreciate the peculiarities of Andalusian culture and history for the comprehension of the position and relevance of Andalusia within the rest of Spain, Europe and the world and study the ways in which the Andalusian identity, economy and society have developed.

13. To debate and analyze the international projection of Andalucía and its role in the current globalisation process, assessing the most important opportunities and problems of this historical phenomenon for our autonomous community both in its past and in its present.

14. To know and handle the vocabulary and the specific research and analysis techniques for the social sciences, for the development of the problem solving skills and comprehension of the most important difficulties in the current society, giving special attention to the causes of the war conflicts, the signs of social inequality, the discrimination of women, the environmental deterioration and any form of intolerance.

15. To carry out case studies and research works individually or in groups, on current world problems, from the historical evolution of the human social formations and of the most relevant features and challenges of the environment not only in Andalusia but also in the rest of the world, by means of the recopilation of information of diverse nature, verbal, graphical, iconic, estadistic, cartographical proceeding from varied sources, which then has to be organized, editted and presented by means of the use of information and communication technologies and following the basic rules of work and research of the Social Sciences.

16. To take part in debates and spoken presentations on current world problems, from the historical evolution of the human social formations and of the most relevant features and challenges of the environment not only in Andalusia but also in the rest of the world, using information and communication technologies for the recopilation and organisation of the information, respecting the turns to speak and other people's opinions, analysing and valuing the points of view different from yours and expressing your arguments and conclusions in a clear, coherent and suitable way respecting the vocabulary and procedures of the Social Sciences.

Subsequently, the above mentioned targets are attainable by means of a few contents that provide the curricula with the theoretical-practical basis on which to work to reach such requirements, and to develop the basic competences. This way, the current division of the Obligatory Secondary Education in two stages and four courses (ix), determines the division of the contents at Andalusian level. Hence, we find the *first stage* from first course to third course of ESO, where the blocks of contents and their criteria of evaluation are detailed.

Then, we find that during the first course of ESO the content blocks which will be developed are: *Block 1. The physical environment*, and *Block 3. History*. Thanks to SIGECAH we can work on the following chapters: *Andalusian physical environment: relief; hydrography; climate; elements and diversity of landscape; bioclimatic areas; natural environment: areas and specific environmental problems of our autonomous community.*

The evaluation criteria which are completely or partially applied by means of the above mentioned tool are:

1. To analyze and identify the ways of representing our planet: the map, and to locate geographical spaces and places in a map using the information of geographical coordinates. CMCT, CD.

2. To have a global vision of the Spanish, European and world environment, as well as the Andalusian physical environment, and of their general characteristics. CCL, CMCT, CAA, CSC.

3. To describe the peculiarities of this physical environment. CCL, CMCT.

4. To place in the map of Spain, as well as in that of Andalusia, the main units and elements of the peninsular relief as well as the main bioclimatic spots or groups. CMCT, CD.

5. To know and describe the main bioclimatic groups that shape the Spanish and the Andalusian geographical space. CCL, CMCT.

6. To be able to describe the peculiarities of the European and the Andalusian physical environment, indicating their particular features opposite to those of the rest of Spain, Europe and the world. CMCT, CCL, CAA.

8. To know, to compare and describe the main bioclimatic groups that shape the European, Spanish and Andalusian geographical space. CCL, CMCT, CAA.

10. To identify and distinguish the different cartographic representations and their scales. CMCT, CD.

12. To know, describe and value the action of man on the environment and its consequences, by means of the achievement, whether individually or in groups, and taking advantage of the information and communication technologies, for the making and exhibition of an analysis essay on this subject centred on Andalusia, and presenting to the rest of the pupils of the group the main conclusions reached by means of the use of diverse sources, a suitable organization and a technical and correct vocabulary. CSC, CCL, CMCT, CD, CAA, SIEP.

In addition to this, during the second course of ESO, the contents of the *Block 2. The human space* and the *Block 3. The History* are developed. In this case, *SIGECAH* helps us to work completely or partially on the chapters*: Andalusia: the population; the territorial organization; demographic models; migratory movements; the city and the process of urban development. Politics of social inclusion and of gender equality.*

This way, the evaluation criteria and basic skills completely or partially worked on are:

1. To analyze the characteristics of the Spanish population, its distribution, dynamics and evolution, as well as the migratory movements and to compare this with the characteristics of the Andalusian population, its distribution, dynamics and evolution, as well as the peculiarities of the Andalusian migratory movements along history. CSC, CMCT, CCL, CD, CAA.

2. To know the territorial organization of Spain, and to analyze the Andalusian model of territorial organization. CSC, CCL, SIEP.

6. To recognize the characteristics of the Spanish cities and the forms of occupation of the urban space, analysing the Andalusian urban model and the pattern of the territory occupation. CSC, CCL.

10. To comment on the information in maps of the world on the population density and migrations. CSC, CCL, CD, CAA.

17. To indicate in a map the main urban areas and to carry out the comment, valuing the proper characteristics of the Andalusian urban network. CSC, CCL, CD, CAA.

18. To identify the role of main world cities as invigorating elements of the economy of their regions. CSC, CCL, SIEP.

41. To carry out research works, whether individually or collectively, on some of the contents treated in this course and to carry out spoken presentations on some of the contents treated in the course. As for that, the information and communication technologies will be used and rules of organization, presentation and edition of the contents will be followed that should assure their originality, order, clarity and suitability in vocabulary and disposition of the sources with regard to the procedures of research in the Social Sciences. CSC, CCL, CD, CEC, CAA, SIEP.

Along the last course of the first stage of ESO, third course, the contents in which SIGECAH can be used are those of the *Block 2. The human space*. Specifically the

chapters: *The place of Andalusia in the world's productive system. Systems and economic sectors. Structure and dynamics in Andalusia of the primary, secondary and tertiary sectors. Main Andalusian economic areas. Andalusia: main environmental problems and possible solutions. Political and administrative organization of Andalusia, Spain and Europe.*

In this case, the evaluation criteria and the basic skills worked on are:

5. To identify the main Spanish humanized landscapes, identifying them by autonomous regions, specifying the peculiar features of the Andalusian ones. CSC, CMCT, CCL.

13. To locate the farming and natural resources in the world map, emphasizing the ones belonging to the Andalusian autonomous community with special attention to water resources. CSC, CMCT, CD.

22. To describe the main features of the most important political systems, confirming the principles and institutions of the democratic and dictatorial forms of government and comparing the functioning of the main electoral systems, analyzing their positive and negative aspects. CSC, CCL, CAA, SIEP.

23. To explain the political and administrative organization of Andalusia, Spain and the European Union, analysing the functioning of the main Andalusian, Spanish and European Union institutions. CSC, CCL, SIEP.

Finally, during the second stage of ESO, that is to say, in the fourth course, the contents increase up to ten blocks, demonstrating a wider accuracy in the contents, and therefore, thanks to SIGECAH we can work at present (since we work with part of the documents generated from the Cadastre of Ensenada): *Block 1. The 18th century until 1789.*

The criteria and basic skills that are acquired by the above mentioned contents are included in this block, namely:

1. To explain the characteristics of the «Ancient Regime» in its political, social and economic senses. CSC, CCL.

2. To know the advances of the «scientific revolution» from the 17th and 18th centuries. CSC, CMCT, CCL.

3. To know the scope of the Enlightenment as a new cultural and social movement in Europe and in America. CSC, CCL, CEC.

Once such aspects have been detailed, we cannot forget the attention to the diversity inside our tool. Hence, and taking into consideration Chapter VI of the Decree 111/2016, of June 14th (x), several alternatives are proposed to solve the difficulties during the learning process in a flexible way and respecting the different pace of every pupil. Nevertheless, every centre will be in charge of proposing the different adaptations or programs depending on their specific needs.

Thus, bearing in mind the collaborative character of the tool, we propose formulae as the allocation of roles inside the work teams that contributes to the collaboration and integration of the students; this way, the pupils will have to do tasks inside the group that present less difficulty (in case of having a slower learning process), or, of a higher difficulty (if it is a question of highly skilled cases).

In addition to these roles, the documentary transcription or the digitised original texts, can be an element that attends the needs of the students inside the classroom, but whether

using it or not corresponds to the teaching planning inside the classrooms that will tutor it and select the knowledge.

We can see therefore, how the curricular elements that SIGECAH tackles inside the classroom are numerous, without focusing only on Geography, but also incorporating History, Spanish and Literature (due to the toponimical study and its evolution), in addition to some elements of Biology and Geology, thus showing their integration and cross-curricular capacity demanded by the administrations as educational methodologies.

5. CONCLUSIONS AND FUTURE WORK

The current process of normative change in the Spanish education with the entire integration of the Constitutional Law for the Improvement of the Educational Quality (LOMCE), modifies the curriculum of Geography and History along the Obligatory Secondary Education. Nevertheless, one of the fundamental intentions keeps on being the comprehension of the geographical space and its evolution along history. Hence, the technological progress over the last decades in Geographical Information Systems, in addition to the numerous tools and methodological resources, have substantially transformed the learning process inside the classroom towards a collaborative, integrating, technological and cross-curricular system.

Therefore, we have seen that the hard work tackled for almost a decade, has made SIGECAH develop in a multidisciplinary way for specialists of different areas, in order to transform the information of textual character, gathered by the Marquess of Ensenada, into a precise cartography that was never elaborated because of historical events.

Then, an effective pedagogical tool proved in the higher education was created, with which to work geographical aspects (physic and human), historical, economical, socio-political and linguistic in a practical, innovative and collaborative way.

With similar intentions, SIGECAH was developed for the Andalusian classrooms of Obligatory Secondary Education. Thanks to the digitised documents in PARES (*Respuestas Generales*) and the ones preserved inside the local historical archives (*Libro de lo Real y Libro de los Cabezas de Casa*), students can comprehend the evolution of physical space through the didactic module comparing it with the inclusion of information. This information, stored in the database by means of *shape* or *SQL files* constitute the foundations for the development of the later cartographic maps on diverse matters according to the targets planned by the teachers.

Hence, we see how the versatility of our tool is remarked, which also allows, by means of the roles inside the work teams, to attend on the diversity of the students of an inclusive way inside the classroom.

Finally, and as we have announced, we must know that it is potentially a vast pedagogical tool, but it needs the specialists' integration in contemporary matters to the project that will bring the enrichment in the learning process of pupils throughout the 19th-21st century. That is why different forms and files keep on developing to integrate the information of these periods.

NOTES OF CAUTION

(i) There is a pair of competitive research projects SEJ2005-07590-C02-02GEOG and CSO2011-29027-CO2-O2/GEOG, financed by the Ministry of Education and the Ministry of Economy and Competitiveness, respectively.

(ii) The project SIGECAH constitutes the doctoral thesis of Laura García Juan, named: *Sistema informático de gestión integral de fuentes geohistóricas (SIGECAH): Desarrollo e implementación del prototipo inicial a partir del Catastro de Ensenada*, Autonomous University of Madrid, 2015. URL: https://repositorio.uam.es/handle/10486/669607. The different elements of the system have been published in several articles that we gather in the bibliography.

(iii) Although at this point of the project it is a little adventurous, our intention in the medium-term is to incorporate the rest of cadastres and censuses of the 18th and 19th centuries.

(iv) *General Answers* to this questionaire, the same for all cadastred towns in Castile, where a general view of the social and economical features of every town was recorded.

(v) *Book of the Real Things*: it receives different denominations according to the provinces or administrations: *Libro de lo Raíz, de Haciendas, de lo Producible, Maestro, Registro (Book of the Root, Book of Properties, Book of Productions, Master Book, Register Book).* It includes the acknowledged goods, rights, revenues and charges for every neighbour, inhabitant or foreigner with cadastred properties in the town. Like the previous one, it shows separate information for both laypersons and ecclesiastic members.

(vi) *Book of the Heads of the House*, also with several denominations: *Libro de lo Personal, Libro de Vecindario* y *Libro de Familias* (*Book of the personal things, Book of neighbourhhod or Book of families).* It keeps the demographical features for residents, whether neighbours or inhabitants, taken from the *memorials*. Like the previous ones, it makes the difference between laypersons and ecclesiastic members.

(vii) The essential criterion followed by the Administration so that a locality could be cadastred as an independent nucleus was that it conformed an independent tax unit (*alcabalatorio*) (Camarero Bullón, 2003: 116-117).

(viii) Order of July 14th, 2016, which develops the curriculum corresponding to Obligatory Secondary Education in the Autonomous Community of Andalucía, certain aspects of the attention to the diversity are regulated and establishes the regulation of the assessment of the pupils' learning process.

(ix) Royal Decree 1105/2014, of December 26th, which establishes the basic curriculum of the Obligatory Secondary Education and of the Baccalaureate.

(x) Decree 111/2016, of June 14, which establishes the arrangement and the curriculum of the Obligatory Secondary Education in the Autonomous Community of Andalusia.

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