

GEOGRAPHICAL EDUCATION 2020: IBERPIX AND COLLECTOR FOR ARCGIS AS TEACHING RESSOURCES FOR SPATIAL LEARNING

María Sebastián López; Rafael de Miguel González

In the current knowledge society, Information and Communication Technologies have been postulated as everyday tools providing us with new skills and abilities. In this context, the commercialization, development and, above all, the familiarization of the society with the Geospatial Technologies (GST) have provoked a rediscovery of Geography as a school subject. However, its impact has not been so widespread in education.

Thus, it is necessary to clarify that the knowledge of space and the acquisition by the student of spatial thinking is a transversal competence. The availability of geographic information allows approximations to specific problems and situations by encouraging active learning, developing critical spatial thinking, identifying sources of information and increasing technological skills. All of this makes it possible to immerse students in real situations through problem-based learning, as well as the acquisition of social and citizenship skills related to territorial processes.

Currently in Spain, the curriculum of Geography continues to favor the use of expository methods, especially in high school level. Despite some skills and geographical information contents that foster the processes of obtaining and processing geographical information. There are many advantages of GST for geographical learning: they encourage the multi-causal explanation of facts and phenomena, increase the autonomous-based learning, increase the understanding of the geographical powerful knowledge, promote the instructional design for creating and presenting geographical information, and develop the interdisciplinary approach of geographical knowledge.

In the present paper, , we propose effective and simple methods and activities of GST tools for the learning of geography in Secondary Education (middle a and high school levels), through an active teaching method.

Strategic Framework for European cooperation in the field of education and training (ET 2020) establishes as one of the priority areas the use of new ICT tools and teacher training for the promotion of creativity and innovation. In addition, the European Digital Competence Framework for Citizens (Vuorikari et al, 2016) and the European Framework for Digitally Competent Educational Organizations (Kampylis et al. 2015), hereinafter referred to as DigCompOrg, define as one of its main pillars literacy and digital skills. This document promotes the implementation of long-term policies on digital literacy and the development of technological skills, thus contributing to the democratization of ICT in society. As the latter document points out (Kampylis et al., 2015, p.4) “the DigCompOrg framework can be used by educational organizations as a guide to the process of self-reflection in its move towards broad integration and effective deployment of learning technologies Digital. DigiCompOrg has seven key elements and fifteen subelements that are common to all sectors of education, developing a total of 74 interrelated and interdependent descriptors (Figure 1). As can be seen, it is designed to focus primarily on teaching, learning and assessment activities.

Of the three dimensions of change advocated by DigiComp (pedagogical, technological and organizational), teachers should focus on adapting curricula to promote digital content and open educational resources through the creation of specific contents by teachers and students; and to reinterpret curriculum to reflect the pedagogical possibilities of digital technologies, creating integrated learning models, reprogramming schedules to promote learning outside the classroom, engaging students in simulated contexts, etc.

Despite the efforts of the European Commission to develop, in collaboration with stakeholders and Member States digital competence frameworks and self-assessment tools for students, teachers and organizers, there is still no widespread application in classrooms. However, it is indisputable that in regulated education (primary and secondary), almost all the countries of the European Union that apply the competency-based education model propose the use of information and communication technologies (ICT) as a tool to help The students to acquire at least some of them. Of course, the use of ICTs for the acquisition of digital competence, followed by mathematical competence and basic competences in science and technology, is more commonly suggested, and its recommendation for the development of social and civic competences. In the Spanish case, LOMCE proposes specific measures to encourage the use of ICT in education and eventually improve ICT skills of students. Consequently, ICTs should be more relevant in curricula.

But the data provided by the European Commission show that today there is an urgent need to boost digital skills in Europe. In fact, the Working Group on Digital Skills and Competencies states that fewer than half of EU children are in highly-equipped digital schools and only 20-25% of them are taught by teachers who are sure to use the technology

in the classroom. But the most alarming thing is that between 50% and 80% of students have never used digital textbooks, specific software or multimedia learning games.

In Spain, these data can be extrapolated to the case of the teaching of Geography (De Miguel, 2013a, p.32) because “comparative analyzes of European curricula and other countries, agree that the teaching of a descriptive Geography is giving way to a learning of a comprehensive, explanatory, analytical teaching Geography, “while our curriculum” continues to favor the use of expository methods.

The main objective of the present paper is to propose a series of practical support activities through the use of different software or network applications, to promote the use of ICT and, specifically, geospatial technologies for geography learning at middle and high school education, to increase the use of GIS at school as a way for educational reform, both methodological and curricular, to develop competences in spatial citizenship, and to dignify and disseminate the value of Geography as a school discipline.

The activities presented respond to two types of applications, one more linked to consultation and geovisualization of information (Iberpix); another, more specific that allows creating and treating geographical information, promoting the active participation of the student (Collector for ArGIS). These two proposals include the different topics of the Spanish national curriculum: educational objectives, geographical knowledge and contents, instructional design, and assessment.

Iberpix software has been produced by the National Geographic Institute (IGN) and it is a tool designed to visualize maps, images and data from Remote Sensing and Land Uses National Center (EIONET Network). This GIS web allows to visualize both in raster and vectorial formats and to perform queries to locate images based on their metadata and their spatial location, and to access to detailed information, as well as performing metric operations.

The second tool, unpublished until now in the geography education literature, truly innovative and novel, is Collector for ArcGis. It is a simple software within the architecture of Geographic Information Systems (GIS) products developed by the company ESRI to provide flexible solutions to the different needs of users. In this case, the user level is basic, since Collector is an easy and intuitive tool to capture and edit geodata during fieldwork via smartphone or tablet, with or without Internet connection. Through this app the student is a creator of geolocated information and they can visualize, consult and analyze the information through ArcGis Online. This tool has already been used in education and its best known application is Digital Atlas School (De Miguel, De Lázaro, Velilla, Buzo and Gullart, 2016).

The main purpose of using Collector for ArcGis in geography teaching at high school level is the student becomes an active subject and a provider of geographic information.

The student is encouraged to create, plan, organize and enunciate new cognitive knowledge, promoting case studies inside and outside the classroom, and the student can implement this geospatial information to different geographic contexts of his/her daily life.

The example of activity here is to perform an analysis of the facilities of the Campus of the Plaza San Francisco (Zaragoza), University of Zaragoza. In this way, the assessment of the different facilities has been configured in a qualitative way (good, bad, regular) and it has been established to attach a photograph of the facility. By having additional graphical information, a debate can be established in class about which are the buildings, facilities or services in better or worse state, and obtain suggestions for their improvement.

The role of Geography at this level of education is to provide students with a critical vision that allows them to understand the importance of territorial and environmental policies, analyzing the different realities of the contemporary world. This subject also has to contribute to develop a civic education that prepares the students so that they are able to face the different problems that can be found in their daily life.

New technologies and specifically Collector for ArcGis helps students to become active agents of geographic information, contributing to the development of spatial intelligence, fostering collaborative learning based on phenomena and acquiring educational skills, mainly digital skills. But also others such as the competence to learn to learn, competence of knowledge and interaction with the physical environment, social and civic competence, and of course, spatial thinking.