THE USE OF QR-LEARNING FOR FIELD WORKING IN GEOGRAPHY EDUCATION. A DIDACTIC EXPERIENCE

Juan Ramón Moreno-Vera, María Isabel Vera-Muñoz

1. INTRODUCTION

In the framework of Geography education the use of maps and field working are a key tool that permits to develop a didactic strategy linking at the same time the theory and experiences. Traditionally Geography education is mostly related to the use of maps inside the classroom, so the way to conceptualized the space was (and is still being) the 2D representation of the maps, but we made ourselves a question, isn't it better to understand the space to go out the classroom and learn directly from the space instead of representing it?

Landscape analysis and field working are the main tool for the investigations of geographers from centuries, so field working is the way that scientist use to build the knowledge of the Geography. If we want that our students will build their own Geography contents, let's them to work as a geographer does, going out the school and learning from the landscape processes.

One of the most important question that education has to answer nowadays is to response positively to society demands and worries, and this sense landscape studies are a field that students must to improve as they are going to interact with landscape and space the rest of their lives.

In the last five years new methodologies appeared in the field of Geography education, and one that is increasing its presence is m-learning strategies. In one hand, the rise of the use of mobile devices has produced that the students use them usually to search and organize information (and as well, obviously, to connect with other users), this great potential of such devices could be used in our classrooms if we prepare and organize practices for the students where they have to reach any new concept. On the other hand, m-learning strategies have another advantage as the students feel that the teaching-learning process is closely related with the tools that they use in their daily life.

Luckily, these devices allow mobility and ubiquity so we can use them in our field works, we are able to use maps and cartographic representations through them, and lastly to organize the information they need to find on the field thanks to QR codes.

2. THEORY FRAMEWORK

2.1. Field-working as a didactic tool

In the beginning of Geography education its labor was to describe correctly the Earth's surface but, little by little, this labor has been increasing with new geographical knowledge that help us to understand how interact natural and human processes.

To reach this new knowledge in Geography Sousa, García & Souto (2016) think that is basic to use the *live laboratory* that is Earth. Between geographers is, more or less, common to work outdoors, but for Geography educators leave the classroom is, sometimes, a goal impossible to reach.

Field working in Geography education is for Pontuschka and Cacete (2007) a great tool because it is an interdisciplinary methodology. Landscape is dynamic and it is continuously changing so to understand this changes it is necessary to use knowledge from various topics as: history, economy, sociology, psychology, physics or nature sciences.

For a good management of a Geography lesson outdoors is necessary:

– To establish real and adapted objectives
– To discuss the topic to research before the visit
– To remark the direct observation of processes
– To pay attention to the physical conditions of landscape and students
– To allow the students to use enough materials to complete the research
– If it is possible, teachers will facilitate the access to information to the students
– To be always close to the students to solve problems or doubts
– After the visit read into the new knowledge using field-working reports

2.2. Web-mapping in Geography Education

Cartography has been one of the most important tool in Geography from Antiquity because is the way we have to represent the world's surface and, consequently, the way we have to understand the concept of space.

But although cartographic tools changed a lot in the last decades, above all, from the arrival of internet (GIS, Google maps, Google Earth, GPS, etc.), this change is not still perceptible in Geography education, where most of the teachers don't use the great possibilities that have, for example, the mobile devices for use the maps.

For Gómez Trigueros (2010), the new model, based on the use of ITC, have to be linked to three considerations:

– Research and discover the new information
– Use the ITC as educative strategy
– Communicate and share the new knowledge through the net.

The flexibility of m-learning connections allows a personalized education adapted to the interests of the student, and paying attention to the context where the student learns, using and preparing activities depending on the landscape that the student have outside the classroom. This is called situated learning, and should be very important if we speak about Geography education.

The problems linked to the use of mobile devices, situated learning and web-mapping could be associated to technical skills. Most of the times, the students use ITC tools better than teachers, so teachers are not very comfortable using this technologies. Furthermore, during the use of situated learning connections could fail and make impossible for the students to find the information required.

2.3. QR-Learning in Geography learning

When we want to use technology in our lessons we have to make ourselves a couple of questions: how we can integrate technology and education? Which is the best strategy to do this?

Koelher and Mishra (2009) thought that there is not a better way, but the key to reach success is to integrate technology and knowledge creatively. The use of QR-Learning (to be fair, or any other technology) doesn't guarantee success in our lessons, but opens a new bunch of educative chances instead. They introduce the TPACK (technology-pedagogy- and content-knowledge) framework to work with technology in the classroom, paying attention at the same level to:

– A technology adapted to the students
– Reliable objectives and conceptual contents
– Pedagogical knowledge of the students

QR (or Quick Response) codes are a system to transfer information through a barcode that could be scanned with the smartphones and tablets. They were introduced by the Japanese company Denso-ware in 1994 to detail the information of the storage. Although

the information that host is limited, it permits to use web-links with unlimited new concepts. QR codes improve the communication between students and cooperative working as Cubillo, Martín & Castro (2011) notice. For Moreno, Vera & López (2014) they presented only an inconvenient that is the lack of wi-fi connection in most of the schools.

The studies around QR-Learning in social sciences are still a few, but we can remark the ones from Rikala & Kankaaranta (2013), Moreno, Vera & López (2014), Moreno & Vera (2016) or Ortega & Pérez (2016).

For De Miguel & Buzo (2015) and De Lázaro (2014) this kind of technologies improve education and answer in a better way to society demands and new goals in the field of the social sciences.

3. METHODOLOGY

3.1. Objectives and hypothesis

The main objective of this paper is to develop a didactic experience in Geography education, that allow to know the learning process of the students using a strategy based on the QR-Learning and the situated learning.

We thought that the starting point of the students is that they don't know what the economic and population data of San Vicente are, although they come every day to study at university which is located in San Vicente.

3.2. Participants

The total amount of students that participated in this didactic experience was 96, and they correspond to the groups 2 and 5 of the topic "Social Sciences didactics: Geography" in the Primary education degree.

3.3. Materials and resources

The field working action starts and finishes from the Faculty of Education of the University of Alicante, and in small groups (three or four students each group) they have to reach four stops in San Vicente town.

In the four stops they will find a QR code with the information that they have to observe directly from the city. To scan the QR codes they must use the mobile device or tablets.

To make easier the visit through San Vicente, the activity was held by a map of the town with the four stops remarked thanks to a Google Earth map.

FIGURE 1. *Map of the activity.* Font: Self-elaboration from Google Earth.

4. DIDACTIC PROPOSAL

The practice was about human and economic Geography, so the information contained in the QR codes that the students had to scan with their mobile devices was related to the economy and population of the city.

The first stop had a green QR code to be scanned, and it belongs to the Primary sector of the economy, that is agriculture.

FIGURE 2. *Primary sector QR code.* Font: Self-elaboration

The groups analyzed the information from the QR code and find the relation between information and the landscape they could see.

The second stop, in red color, was about the industry and the secondary sector of the city, mainly held by the cement company that have a big factory surrounding the city.

FIGURE 3. *Industrial QR code*. Font: Self-elaboration.

The third stop, the one in yellow color, of the visit was the old town of San Vicente, where the student could see the functions and services that a city center offer to the citizens.

FIGURE 4. *Old town QR code*. Font: Self-elaboration.

Lastly, the students visit the stop that belong to the urban development of the city of San Vicente, a new area in the town that offers services (schools, sport areas, university, etc.) and with wider avenues and taller buildings.

FIGURE 5. *Urban development of the city*. Font: Self-elaboration.

5. RESULTS

The results obtained in this didactic action were very positive taking in account that most of the students, although they came every day to study in San Vicente, didn't know the human and economic details of the town.

In the agriculture stop they could study what are the main productions in the city. The pre-test that the students did before making the visit, show that the production of almonds and olives was only known by the 20% of the students.

After making the visit, analyzing the QR information and observing the fields of almonds and olives, the 70% was capable to respond almonds as the main production of the city.

Regarding to the secondary sector, industry, the students visited the cement factory of San Vicente in the second stop. In the pre-test they were asked if they knew the pollution problem the factory had. Only the 20% of them, knew the problem of the factory before making the experience, but the 90% knew the pollution problems of the factory after reading the QR and visiting the factory.

Finally, in the third stop, they were asked for the main buildings of the town and the services that the town offers. Before the action only the 30% named shopping as one the main services of the old town, but after the visit the 100% of the students answered shopping between the services of the town.

6. CONCLUSIONS

The use of QR-Learning as strategy for situated learning has been very positive if we attend to the results of the students that were all improved by the visit to the city of San Vicente.

The primary sector of the economy was the first stop, and the first surprise, because most of the students didn't know what the productions in the city were, although most of them come from close towns that have the same productions as San Vicente.

Regarding to the industry, the problem of pollution in San Vicente was a very important case during the last decade, in fact the cement factory in San Vicente is now abandoned and the factory moved a few kilometers far from the city center. After making the visit and scanning the QR code, the 70% of the students knew the case and the problems linked to the cement production.

Finally, the functions of the city were mostly clear for the students, unless shopping that was forgiven by the students before making the situated experience. After the visit all of them remember shopping as one of the most important services in the city.

As Schwabe & Goth (2005) or Rikala (2015) notice the use of QR-Learning as strategy improve the motivation and curiosity of the students to learn, but not only, because as Moreno (2016) commented it also improve the content knowledge of the students.

In sum, we can say that the methodology of situated learning in Geography, and the use of QR-Learning have a very good results, changing the initial conceptions and improving the knowledge of the students.