Chapter 16
Flipped Teaching: A Useful Method for Cloud-Based GIScience Learning

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ABSTRACT
The current methods of teaching and learning are changing. Emerging technologies that focus on maps, aerial images and the Internet offer Cloud-Based GIScience (Geographical Information Science) learning enhancing geography lectures and lessons in the twenty-first century. Two selected cases are presented focusing on world conflicts, the Spanish humanitarian action and peacekeeping missions in Africa, and the Spanish agrarian landscapes. These were utilized in the pre-service teacher training compulsory year, which provided initial training for future teachers on the Geography syllabus. The two topics presented demonstrate the utility of collecting information from different sources, using different technologies and methods, and combining flipped teaching, collaborative work and Cloud-Based GIScience learning in creating a final product: an interactive map on a particular topic that increased both teacher and student motivation. Students can learn how it is possible to take advantage of the Cloud-Based GIScience in terms of spatial thinking and digital competencies in Higher Education.

INTRODUCTION
The current methods of teaching and learning are changing. Emerging technologies facilitate the shift in teaching lectures and lessons. Maps, aerial images and the Internet offer Cloud-Based GIScience learning, enhancing geography classes in lectures and lessons in the 21st Century. Technology provides geographical information (GI) from online Geodata or data already collected which can be visualized, DOI: 10.4018/978-1-5225-3053-4.ch016
manipulated and analyzed online. The current possibilities of geolocation, free access to open data and the opportunities to create an interactive map online are important challenges that we proposed to deal with using the flipped teaching method and collaborative work. Students become the centre of their own learning, they enjoy what they learn, and they learn from their own way of learning. The teacher acts as a facilitator of learning. Students not only learn skills and the subject of GIScience itself, but also how to learn throughout their lives. They learn about technologies, how to deal with viewing large Geodata, and how to acquire collaborative and digital skills using flipped teaching. They learn from a particular subject as well as from the learning process.

The aim of this work is focused on explaining how, in using flipped teaching and collaborative work, students can learn using Cloud-Based GIScience on a particular topic and how it is possible to take advantage of the Cloud in terms of spatial thinking and digital competencies in Higher Education. This learning paradigm helps education and in the development of professional skills. Student motivation, collaborative strategies and active methodology are involved in this way of learning.

Two examples which illustrate this are on the topic of world conflicts, Spanish humanitarian action and peacekeeping missions. Both of these were especially focused on Africa and on Spanish agrarian landscapes. They were followed up by the pre-service teacher training compulsory year, involving initial training for future teachers on the Geography syllabus, at the Madrid, Zaragoza and León Universities. In the two examples, student motivation increases from collecting information from different sources using different technologies, as well as from creating knowledge to be shown as a final product: an interactive map on a particular topic.

The first topic is based on a project funded by the Ministry for Defense regarding world conflicts and Spanish humanitarian action around the world and peacekeeping missions. These provide the opportunity to look at multicausality and global history. The second, funded by the University of Madrid (UCM) the Innovation and Improvement of Teaching Quality Project, shows the process of creating a web map showing agrarian landscapes (Lázaro, Izquierdo & González, 2016). Flipped teaching proved useful for further discussion in lessons.

The result of all this work will be different story maps focused on a specific topic using inquiry-based learning by collecting and using Geodata under the flipped teaching method. Thus, the process “learning while doing” make Cloud-Based GIS learning possible. Then, at the end of the students’ work, and as a result of each study, a web mapping application on a WebGIS has been created on the topic as a type of storytelling. Another innovative aspects of the work is based on how to integrate a web map with digital storytelling, using open Geodata provided by a variety of local, regional, national and international organizations. Another aspect is, how to learn about the topic using Cloud-Based, GIS learning through collaborative learning under flipped teaching and an active student-centered method.

The study presents two collaborative story maps created from the results of the students’ use of an active learning collaborative methodology using flipped teaching. These maps tell a story on a particular topic with interactive web maps (ESRI 2012). ArcGIS Online (AGOL) & WebGIS of ESRI have been essential and useful tools in the process of creating the storytelling maps. Students learn both during and after creating the web maps. Jill Eck (2006) has demonstrated the efficiency of storytelling when it comes to learning aims.

The first map that is related to world conflicts – Spanish humanitarian action and peacekeeping – especially in Africa provides an opportunity to look at multicausality and global history. World conflicts, as a topic, has also been used by Wirkus (2015). The second topic is the Spanish agrarian landscapes.