

# Sustainable Development and Digital Literacy in Educational Practice and Politics. Case study on participative geospatial technologies applications of Greek secondary students

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## Abstract

In the 21st century, our world faces various challenges that greatly affect modern life and show the dynamic relationship and interaction of human activities with space and the environment and the immediate need to ensure sustainable development. The answers on how to achieve this interaction and raise sustainable development issues from the education sector are presented in this research. Specifically it is explored the participative geospatial technologies applications (PGST) of Greek secondary students in geographical and environmental learning for sustainability. Data analysis from these applications showed that students acquired skills such as participatory interaction, interpersonal communication, geospatial thinking and high cognitive functions (collaboration, crisis and feedback).

**Keywords:** PGST, Sustainable Development, Educational practice, Spatial environmental planning

## 1. Introduction

This study refers to the contribution of geographic education in the development of knowledge, attitudes and skills for environmental protection in the context of sustainable development of the world's societies and the democratizing of its dissemination to the web 2.0 users through sociocultural constructivist view of learning. Thus, specific concerns identified regarding the young people participation in research and collaborative actions using Web 2.0 applications, in the context of geographical and environmental education for sustainability, through socio-cultural constructivist view of learning. In particular the concerns relating to the way of the young people interaction using an educational online environment and how it can help to improve their learning process.

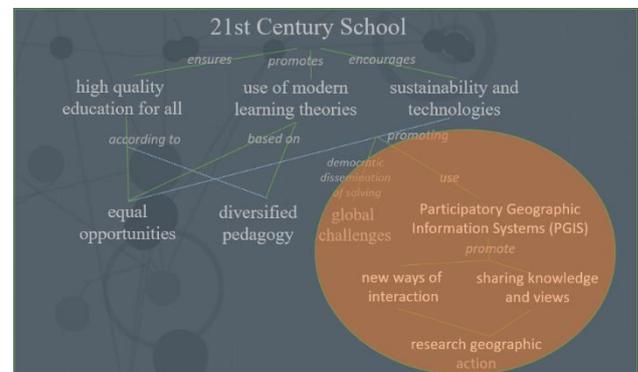


Figure 1. 21<sup>st</sup> Century School

## 2. Research Process

A small sample of 10th grade students of a public General High School in Athens (N=16; 10 females and 6 males; aged 15 – 16) participated in an eight-month (three time interval of 73 days) “Nuclear Energy” project, creating a learning community.

The sample also varied in their socioeconomic and cognitive background. Most students had a previous experience in geographical actions, while 25% had used social computing for educational and research purposes.

For a better understanding and analysis of students’ research activities, a quantitative content analysis (QCA) was carried out using as an analysis unit, the exchanges of the students' learning community. For the analysis, the Interaction Analysis Model (IAM) was applied. And improved with other indicators (skills) that are in line with geographical research stages and are a guide to the implementation of a geographic research project.

Enhanced IAM has five phases of development in the process of constructing knowledge along with geographic approaches/skills: I) sharing/ comparing knowledge; II) dissonance, negotiation/ co-construction;

III) negotiation/ co-construction; IV) testing tentative constructions; V) statement/ application of newly-constructed knowledge, and a) asking geographic questions; b) acquiring geographic information; c) organizing geographic information; d) analyzing geographic data; e) answering geographic questions.



**Figure 2.** Exchanges distribution per time interval and IAM phases



**Figure 3.** Exchanges distribution per time interval and geographic skills

Using PGST applications, students seemed to follow a screening process, search, comparison and exchange of information, exchange of arguments, further explore and promote other views, as well as to assess the feasibility of the proposed solutions, reading and interpretation maps and other graphical representations of spaces and places. All these actions led participants to reach higher stages of sociocultural constructive interaction with gradual development of basic and essential geographic and environmental skills. Overall, we can conclude that the proposed use of social networks in secondary schools to enhance the geographical and environmental education of students had positive learning outcomes.

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