

INTRODUCING GIS TO LEARNING AND STIMULATING INTERACTIVITY AMONG STUDENTS

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ABSTRACT: *Railway Technical College "Unirea" in Pa cani embarked on the ambitious two-year Erasmus KA220 project, "GIS FOR GIST OF EUROPE," commencing in December 2022. This endeavor is significant for both the institution and the local community. The project focuses on using Geographic Information Systems (GIS) to study the impact of climate change on the European environment. Interactive GIS maps allow users to explore the regions most affected by climate change, assess its effects on biodiversity and natural resources, and develop strategies to mitigate these environmental challenges.*

Within the Erasmus+ initiative, "GIS for Gist of Europe," GIS plays a central role, aiding urban planning, territorial development, and sustainable resource management. It also contributes to efficient communication networks and waste management systems. Project activities include online and in-person meetings, as well as Learning, Teaching, and Training (LTT) sessions. Key objectives involve creating two eLearning platforms, one with STEM educational resources featuring GIS maps and another for GIS training. The project fosters the advantages of GIS in data accessibility, correlation, and localized database creation. This project employing GIS will address climate change's impact on Europe, enhancing education and advancing climate-resilient strategies. The digitization of Geography remains pivotal in modern education and research, deepening our understanding of our ever-changing world.

Keywords: *GIS FOR GIST OF EUROPE, Geographic Information Systems (GIS), climate change, interactive GIS maps, natural resources, urban planning, sustainable resource management, eLearning platforms, STEM educational resources, digitization of Geography.*

Railway Technical College "Unirea" in Pa cani is carrying out an Erasmus KA220 "GIS FOR GIST OF EUROPE" project from December 2022 (a 2 year project) which proves to be an unprecedented challenge in European partnership both for the teachers and students of the college and for the local community.

GIS, or Geographic Information System, is a technology that combines geographic data and spatial information to manage, analyze, and visualize data in a geographic context. It enables users to understand relationships and patterns in spatial data, aiding decision-making in a wide range of fields.

In the context of the "GIS FOR GIST OF EUROPE" project, GIS is used to explore the impact of climate change on the European environment. Interactive maps allow users to explore where the greatest climate change is occurring, how it affects biodiversity and

natural resources, and how these issues can be addressed. This can help to better understand the impact of climate change and develop solutions to protect the environment.

GIS requires four main components to function effectively. Firstly, geographic data is needed, which includes digital information about various geographic aspects such as land, rivers, streets and in the context of the "GIS FOR GIST OF EUROPE" project includes data related to temperature, precipitation, sea levels and land cover. The second essential element is GIS software, which gives users the possibility to view, analyze and manage this geographical data, being used in the project to create interactive maps highlighting the effects of climate change on the European environment. Hardware is the third component, comprising computers, GPS devices and other equipment needed for data collection and processing,

essential in the project for gathering information about weather and sea levels, among other things. Finally, the dedicated staff, in this case, the teachers from Pa cani, represent the human component, responsible for the development, administration and use of this geographic data within the project, with the aim of exploring the impact of climate change on the European environment.

In our Erasmus+ project "GIS for Gist of Europe", GIS has many uses relevant to our objectives. First, within this project, GIS can be applied in urban planning and territorial development, supporting local authorities in developing strategies for urban development, infrastructure and public transport, to face climate challenges. Also, GIS has a crucial role in the management of natural resources, including forests and water, essential aspects for environmental conservation, a central objective of our project. In addition, through GIS, we can plan communication networks, such as mobile telephony and the Internet, to facilitate communication in Europe and ensure access to essential information about the environment. At the same time, GIS can also be applied in efficient waste management, contributing to the optimization of collection routes and the identification of suitable locations for waste storage, thus reducing the impact on the environment.

Also, in our project, GIS can play a significant role in monitoring and assessing damage caused by natural disasters such as floods or earthquakes, helping to quickly intervene and reduce risks to communities. In addition, GIS-based online map and location services similar to Google Maps can be developed and integrated into the project to provide an accessible and useful source of geographic information for all our partners and users in Europe.

Thus, GIS represents an essential tool for achieving our goals within the "GIS for gist of Europe" project, having a significant impact on sustainable development, environmental conservation and facilitating communication in the European region.

GIS is of significant importance in decision making in an increasingly complex and interconnected world. It provides a holistic view

of data, helping organizations save time, resources and make better informed decisions. GIS technology is continuously evolving. The use of real-time data, artificial intelligence and big data analysis are significant trends contributing to the continuous development of GIS. Taking into account the importance of knowing as well as possible and understanding the way it works, as well as the wide applicability of Geographical Information Systems, the professors from the "Unirea" College in Pa cani, decided to enter into a partnership within a European project "GIS for Gist of Europe", within the partnerships for cooperation in the field of school education - KA 220. The project addresses the issue of climate change by including geographic information systems GIS (GIS) in school programs in the Science curriculum area, is ongoing (01.12. 2022 - 30.11.2024). Through the targeted target groups and the planned results, the project aims to be relevant to the objectives and action priorities in the field of school education

The project is implemented by 5 partners: Belgium (EuroGeo Association), Latvia (Riga Secondary School No. 25), Spain (Universidad de Zaragoza), Turkiye (Innovative Education Association) and Romania (Colegiul Tehnic de C i Ferate "Unirea" in Pa cani).

This project aims to achieve three main final results:

1. GIS for the future - creation of an LMS Platform - an open source management system that makes the results of the first two projects accessible
2. Realization of e-Learning GIS module against climate change - a platform that will contain courses for teachers. It will be structured according to the individual pace of learning and will have access to the native languages of the partners (Spanish, Latvian, Turkish, Romanian) and English.
3. Conducting GIS Case Studies against Climate Change - This is the section where appropriate activities will be found for learning outcomes related to climate change in Geography and Natural Sciences courses.

Activities are based on online and physical transnational project meetings as well as LTT. The basic activities aim at building two eLearning platforms: a site with curricular resources for STEM disciplines (Geography, Physics, Biology, Chemistry) with GIS maps - site built by the Turkish team, qualitatively monitored by Spaniards and the GIS module - eLearning platform for training (educational clips about how we build these GIS maps, which must be completed individually, without a trainer - like JAR). Another activity aims to develop GIS case studies with learning activities for STEM, involving the 3 schools from Romania, Latvia and Belgium.

Based on these results of the project, an article is to be published on SEG. The training followed on the module built by the Belgian team (educational clips about GIS) has an evaluation section and certificates of completion will also be issued.

On this platform, we want to prepare about 1000 participants, from all over Europe. There will be about 100 people at the multiplication conference as a physical variant training in Romania.

In the first year, until the year in December, we have to develop the platforms and do the online course on the GIS module built by the Belgians.

In the second year of project implementation, in 2024, as many educational resources as possible are being developed for the site built by the Turkish team: examples of good practice, lesson projects, demonstration lessons with GIS in the three partner schools in Romania, Belgium and Latvia, plus the conferences in physical format, with about 100 people/country.

The most recent activity took place between August 27th -31st 2023, when the second mobility of the GIS for Gist of Europe project took place, within the partnerships for cooperation in the field of school education - KA 220 and took place in the city of Ghent, in Belgium, at the Faculty of Geography of the University. The partners present at the meeting brought together representatives of the five European countries participating in the project.

The training activity focused on the presentation of GIS learning tools and resources, climate data and symbols, using GIS, through educational resources (DigCompEdu, the Bio-Maps project, Dashboard, StoryMaps using ArcGIS).

The goals of the mobility aim to introduce GIS into learning and stimulate interaction between students, while facilitating the transfer of environmental protection practices into everyday life to help combat climate change. The aim of this mobility of the GIS For Gist of Europe project partners (KA 220) was to address the theoretical and practical aspects of teaching using geographic information systems (GIS).

The advantages of using GIS (Geographic Information System) derive from the fact that it is a modern tool that allows the collection, analysis and management of data. More and more often, digital Geography is synonymous with today's Geography, that's why involvement in Erasmus projects helps us enormously. Digitization of Geography becomes a methodological component that uses computing techniques and computer programs, for the quantification of spatial elements and their spatio-temporal analysis, in order to identify processes and phenomena with the aim of establishing optimal improvement measures, greening.

The benefits of teaching with GIS consist in the access to mapped information available online globally, the correlation of information from several digital maps to observe the geographical process and phenomenon, the creation of an initial GIS of the local horizon, the temporal and spatial updating of geographical data, the localization easily and measure geographic elements (distances, surfaces, volumes, etc.).

In conclusion, the digitization of Geography is a particularly important methodological component in the field of this discipline and in many other related studies. This process involves the transformation of geographic data and spatial information into accessible and manageable digital formats. This is why the digitization of Geography is considered crucial.

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