EverGreen

INCLUDING EVERYONE IN GREEN DATA ANALYSIS

ABOUT PROJECT

The project is conceived to strengthen the digital readiness, resilience and capacity of educators and students and build their digital and sustainability competences. This will be done concretely through the creation of a new and innovative course and learning and teaching materials on data analytics & environmental data analytics, and through cross-sectoral transnational cooperation. The project will help overcome the skills mismatch on national and EU level by increasing the number of IT graduates who are trained to analyze data, spot trends, make forecasts, and extract information to help decision-makers make better-informed decisions. Project outputs will be developed in cooperation with the business sector, in particular the IT corporation Oracle and the City of Kranj, which joined us as associated partners.

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Oracle is providing information about IT industry and labor market trends, and is involved in both the development of the course curriculum and in dissemination activities aimed at increasing its use beyond the project consortium. City of Kranj contributes to raising awareness about green sustainability, i.e. the cross-road between environmental health, economic vitality, and social benefits. The project will overall contribute to the expansion of the role of higher education in local communities in two ways. Firstly, by making the developed course curriculum and materials available to young people who are not enrolled in higher education (NEETs) and developing especially for them a digital module with practical exercises. NEETs will be enabled to attend lectures at the premises of the higher education institutions involved in the project, and they will complete the digital module under the supervision of partner Trokut's trainers. The inclusion of young people who would otherwise not be part of the higher education system, and the international nature of the project consortium would increase the inclusion and diversity of all involved partners for the project duration and after that. This will be done through the joint development and localization in 4 EU languages of a course curriculum, a digital module with practical exercises, and learning and teaching materials, and through networking across sectors (with the business sector, vocational schools, and a NEET academy) and countries (Slovakia, Croatia, Slovenia and Czechia). Secondly, the project will support the green capabilities of the higher education sector by addressing the climate crisis & environmental challenges arising on local and global level. This will be done by cooperation with local authorities which will provide data and case studies to be used in practical training exercises. The intersection between digital and green will lead to the identification of sustainable solutions of environmental challenges on local, national and EU level, while the inclusion of diverse target groups will increase local impact.

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PROJECT PARTNERS

University of Žilina, Slovakia

Polytechnic of Šibenik, Croatia

University of Maribor, Slovenia

University of Pardubice, Czech Republic

Trokut Šibenik d.o.o., Croatia

Thank you, **Oracle** and the **Municipality of Kranj** for the support!

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The Evergreen Erasmus+ project consortium consists of 5 partners from 4 European countries. University of Žilina (Slovakia), Šibenik Polytechnic (Croatia), University of Maribor (Slovenia), University of Pardubice (Czechia) and Trokut Šibenik d.o.o. (Croatia) joined forces to create educational materials for environmental data analytics. Additional support for the project was provided by Oracle Academy and the Municipality of Kranj. The main objectives of the project, which are in line with the expected project outcomes, are to train and share expertise among the educational staff and to develop and test an extracurricular course at the bachelor level with a digital module on environmental data analysis. All project partners will contribute to these outcomes according to their experience and expertise.

The Faculty of Management Science and Informatics at the University of Žilina (UNIZA FRI) from Slovakia is the project's lead partner. The researchers at UNIZA FRI not only have experience in managing EU projects but also have advanced expertise in data analysis. The key value of UNIZA FRI is its focus on collaboration with industry, as the faculty has more than twenty collaboration agreements with global industry partners, with a focus on business analytics and machine learning. In addition, an annual summer school on machine learning is organized.

The Croatian Polytechnic of Šibenik trains students in the fields of social and technical sciences, especially in information technology, tourism, organization and transportation. They have important experience with EU projects involving young people not engaged in education, employment or training (NEET) in educational activities. In addition, the professors of the Polytechnic of Šibenik have extensive experience in the research of learning and teaching processes, in the development of teaching tools for distance education and in the implementation of ICT tools in education. They have in-depth knowledge and understanding of data analysis and its use, especially in education.

The Faculty of Organizational Sciences at the University of Maribor (UM FOV) in Slovenia specializes in various aspects of organizational sciences, including information systems. UM FOV has valuable experience in creating learning and teaching materials and assessments, and in delivering courses related to digital technologies as enablers of sustainable development. Collaboration with partner universities, businesses, the public sector and organizations in the region and beyond means that they strive to be a sustainable and socially responsible public institution.

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The Faculty of Electrical Engineering and Informatics at the University of Pardubice in the Czech Republic prepares students for careers as skilled software engineers, programmers, signal transmission experts, or network administrators. Their researchers focus on a variety of research questions in applied and experimental development. They use their experience in the transfer of scientific results into practice to coordinate the creation of four case studies that provide examples of how data analytics can be used to contribute to environmental sustainability at the local and EU levels.

Trokut Šibenik d.o.o. is an entrepreneurial centre for new technologies in the city of Šibenik in southern Croatia. It is a melting pot, a destination and a place where new ideas are created and innovations flow with ease. Trokut Šibenik d.o.o. has the most flexibility in developing courses and programs that engage different audiences, and is responsible for developing the digital module with hands-on exercises and assessments for NEET and for other interested learners outside of higher education.

The two associated partners, Oracle and the Municipality of Kranj, will support the project by providing access to their resources and data. Oracle Corporation is one of the largest software companies in the world, specializing primarily in database management. The Oracle Academy Initiative works with educators to provide them with the help and resources they need to prepare their students to develop basic computer knowledge and skills. The Municipality of Kranj has adopted a strategy for sustainable urban development until 2030, which defines the most important development tasks for Kranj as a central town in the Gorenjska region of Slovenia. Within this framework, priority thematic areas and strategic goals are defined, with digitalization playing a crucial role. Kranj strives to become an environmentally sustainable, advanced, and vibrant urban centre, with a special focus on a well-organized information environment. Digital development based on data analysis will ensure sustainable development and create an open platform for new environmental solutions and technologies in the future, which is a key tool for Kranj's long-term success.

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OUTPUTS OF THE PROJECT

- **Transnational Project Team Meetings**

The project envisions 8 transnational project meetings, 4 physical ones and 4 online ones. One physical meeting took place in each of the 4 countries included in the project, at the premises of the higher education institutions partners on the project. Each partner institution was in charge of organizing a number of physical and/or online meetings. Since there are two partner institutions from Croatia, they organized one meeting each, with the Polytechnic of Šibenik organizing the physical one and Trokut - the virtual one. The remaining three partners organized 2 meetings each (one physical and one online). The kick-off meeting took place in Žilina, Slovakia and the final meeting was in Kranj, Slovenia. Two representatives of each of the five partner institutions included in the project (professors, lecturers, postgraduate teaching assistants and trainers) will constitute the project team and attend all meetings, or a total of 10 people. The meetings took place approximately every three months. They will be used to set up collaboration among the project team and build a project culture, to separate responsibilities, follow project progress, plan jointly activities, and discuss administrative planning and reporting. The project team members of the visiting institutions will be also enabled to meet in person the educators and students of their host school. A Dissemination Plan has been defined, and risks and challenges will be updated.

During the final meeting, all project outputs will be presented, a final report made, evaluations by the project team discussed, and brainstorming on future cooperation will take place.

The physical and online activities will lead to direct collaboration, communication, and joint work, which will help build a strong, high-performance project team and thus ensure the successful completion of all other work packages. The reaching of the specific objectives will contribute to the fulfillment of all three general project objectives as without a functioning project team and regular collaboration, none of the project results can be achieved. The activities will particularly support general objective 3 of the project contributing to the establishment of a successful cross-

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sectoral partnership comprising members from 4 countries (Slovakia, Slovenia, Croatia and Czechia) and three sectors (higher education, non-formal education and business). The meetings will help build a team culture, align team members' expectations, establish rapport among team members and with target groups, and ensure overall efficient and friendly communication. The transnational project team meetings will also provide team members with the time and mutual assistance needed to fulfill institutional responsibilities, and to work together. The meetings will be used to set up collaboration among the project team and build a project culture, to follow project progress, plan jointly activities, and discuss administrative planning and reporting. They will also contribute to the boosting of the partner institutions' capacities by internationalizing their work and leading to continuous and sustained knowledge exchange. The project team members who are going to participate in the transnational project meetings are the same ones who will work directly with students and other educators, and they will disseminate information about the project on institutional and local community level, which is also critical for the project's impact on local and EU level.

Picture: TPM meeting in Žilina

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Picture: TPM meeting in Pardubice

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- **Training and Exchange of Expertise for Educational Staff**

According to the European Commission's Program for the Modernization of Higher Education, higher education should enhance individual potential and equip graduates with the knowledge and key competences they need to succeed in their profession on the labor market.

A survey conducted by our project team of 180 students enrolled in our undergraduate IT programs revealed a strong demand for data analytics training. More than 70% of students identified data analysis as important to their professional development, and 63% expressed interest in enrolling in a data analytics course.

Target group

- 10 ICT professors, lecturers, postgraduate assistants, teachers and NEET trainers (minimum 2 per partner institution) were invited to 2 three-day trainings (Šibenik (Croatia) and Kranj (Slovenia)). The training was devoted to environmental data analytics. Each participating university provided a team that will participate in the training (in English). The training was also including discussions with external companies.

- 60 students were trained through a newly introduced subject focused on data analytics. In most cases, it has been an intensive course before the beginning of the semester. Completion of this course does not require an IT education.

- 8-10 young people aged 18 to 29 in the NEET category. Theoretical lectures will be in a hybrid form with the possibility to participate even if the person is not a student of the given faculty/university. Practical exercises will be carried out online or hybrid form will be used. Materials will be distributed free of charge in electronic form, meetings will be recorded and available to participants.

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Pictures: Environmental data analytics training of educators in Kranj and Šibenik

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- **Development and Piloting of Bachelor's Level Extra-curricular Course with a Digital Module on (Environmental) Data Analysis**

The specific objectives of the work package are to increase IT undergraduate students' and NEETs' knowledge in the areas of data analytics and environmental data analytics, and to create a pool of knowledge and resources in higher education targeted at developing educational staff's and students' digital and environmental sustainability competences. These specific objectives will contribute directly to the realization of all three general objectives of the project. The increased knowledge in the areas of data analytics and environmental data analytics of both educators and learners will contribute to the development of their digital and sustainability competences. The use of jointly developed resources, such as the extracurricular course curriculum, the learning and teaching materials and assessments, the digital course with practical exercises, the case studies and the academic articles, will enable all partner institutions to share resources on project level but also to build a case outside of the consortium for the use of more modular and flexible forms of education reflecting learners' different learning preferences. IT students' and NEETs' employability will be increased through their equipment with concrete, highly-demanded on the labor market knowledge and competences, and a partnership with the business sector and local communities, which will ensure the use of concrete, relevant and useful digital tools and case studies. Both associated partners from the business sector will get involved with the creation of the course curriculum, learning and teaching materials and assignments, and the digital module with practical exercises through the provision of digital tools and real-life digital data. The work package will contribute towards the project's overall purpose of building the digital and green transformation of higher education through cross-sectoral transnational cooperation and IT curriculum modernization.

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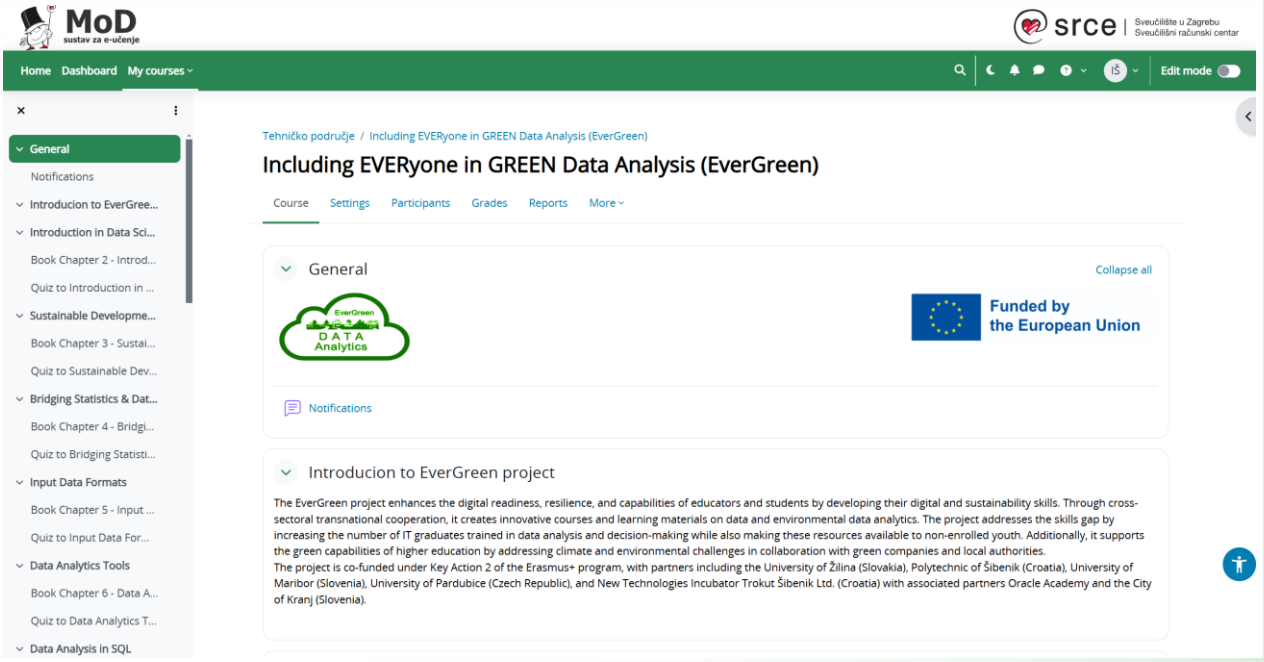
We have developed digital learning module on learning platform *mod.srce.hr* with all book chapters available for learning, and quiz questions within each chapter. We begin with an examination of big data and its structured nature, explaining the challenges and opportunities presented by the vast, diverse, and rapidly growing datasets. Through a thorough examination of the fundamentals of applied statistics, including data pre-processing and interpretation, readers will gain essential insights into the basic techniques underlying effective data analysis.



Picture: Learning platform including EverGreen book chapters

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In addition, we provide a systematic overview of input data formats and the various data analysis tools available, which are essential for competent data management and analysis. From using SQL for data queries and manipulations to understanding the intricacies of data warehouses and marts, we provide a comprehensive toolkit for navigating the complexities of modern data ecosystems. We also take a look at Oracle Data Integrator, a centralized tool for orchestrating seamless data integration processes.

With a focus on empirical analysis, we explore data analytics with Python and Apache Spark and demonstrate their practical use in processing diverse datasets and performing complex analytics tasks. Using rigorous use cases such as air quality measurements in the municipality of Kranj, World Ocean Database, leveraging open environmental data for comprehensive analysis, employee management case and the creation of Oracle machine learning AutoML models, we show the tangible impact of data science methods in promoting evidence-based decision making and sustainable development goals. We also explore data use, business data strategy and data excellence management, which are essential to maximizing data value, ensuring strategic alignment, and maintaining data integrity.

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- **Multiplier events**

The specific objectives of all multiplier events is to promote the project results and outputs and their wider use by different sectors and actors, to support their adoption & sustainability on local, national and EU level, and to subject project outputs to peer review by colleagues in the higher education sector. The multiplier events contribute directly to the 3rd general objective of the project by increasing the capacities of our 5 partner institutions for work with diverse groups of learners (higher education students, NEETs, secondary pupils) and for establishing cross-sectoral transnational cooperation. They also support the 1st general objective of the project contributing to the development of the digital and sustainability competences of educators by subjecting their work to peer review and knowledge exchange. Project outputs have reached and are used by a larger number of educators both within the consortium's institutions and outside of them, and new opportunities and partners for future partnerships are identified. The multiplier events enable diverse groups of learners and educators to learn about the project and its outputs, and to use them for the project duration or after. The digital module with practical exercises is particularly suited for independent work, and vocational secondary school pupils and NEETs can develop new digital skills by completing it on their own initiative. All practical exercises are translated in local languages.

Students and NEETs included directly in project activities participated in the multiplier events promoting the use of outputs outside of the consortium. This was an opportunity for them to disseminate information about project results & activities and promote the development of young people's digital and sustainability competencies on local, national and EU level.

Lastly, multiplier events were used to promote the assistance received from the Erasmus+ program. We have organized three types of multiplier events. Presentation in schools, presentation for women in IT and presentation for business community.

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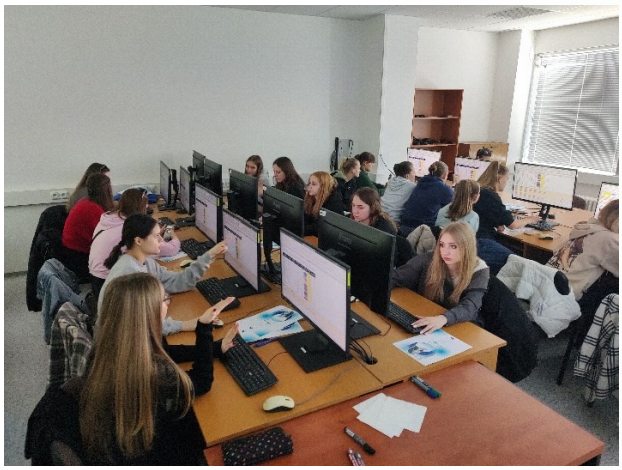

Pictures: Multiplier events, presentations in schools, Žilina and Pardubice

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Picture: Multiplier event “Girls in IT”, Šibenik

Picture: Multiplier event “Girls in IT”, Kranj

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Picture: Multiplier event “Presentation to the business community”, Žilina

Picture: Multiplier event “Presentation to the business community”, Šibenik

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Pictures: Multiplier event “Presentation to the business community” Pardubice and Kranj

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The design and implementation of the project are divided into five work packages - project management, transnational project meetings, teacher training and knowledge sharing, development of the course (subject), its pilot testing and deployment in the environment of local members of the project consortium (75 hours of teaching, 3 ECTS) and multiplication activities.

Technology can significantly improve our lives, support decisions. The way, how we approach individual problems and challenges is always to us. The way we produce the data and analyze them is up to us. The representation of the results is up to us, as well.

And that's the real conclusion. We believe that with project EverGreen and its outputs everyone will be able to understand environmental analytics, the complexity of the entire system and process of data analysis, from the data collection, its cleaning, processing, storage references, up to the analytics process in various environments in order to obtain results, identify relationships, support decision-making and thus save resources, optimize costs, move forward and achieve goals. We believe that each of us is aware of the responsibility towards the environment. We are not alone on this Earth and it is critically important to leave a livable space for future generations.

https://evergreen.fri.uniza.sk/

On-demand webinar

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Published books

5 languages

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