BISON
BIODIVERSITY AND INFRASTRUCTURE SYNERGIES AND OPPORTUNITIES FOR EUROPEAN TRANSPORT NETWORKS

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 101006661

Deliverable D2.6

Capacity-building Platform

Due date of deliverable: 30/06/2023

Actual submission date: 17/08/2023

Project details

Project acronym	BISON
Project full title	**B**iodiversity and **I**nfrastructure **S**ynergies and **O**pportunities for European Transport **N**etwork
Grant Agreement no.	101006661
Call ID and Topic	H2020-MG-2020 / MG-2-10-2020
Project Timeframe	01/01/2021 – 30/06/2023
Duration	30 Months
Coordinator	ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS (CERTH/HIT)

Document details

Title	Capacity-building Platform
Work Package	WP2
Date of the document	17/08/2023
Version of the document	1
Responsible Partner	STUBA
Reviewing Partner	MINUARTIA (Carme Rosell)
Status of the document	Final
Dissemination level	Public

Document history

Revision	Date	Description
01	04/07/2023	First Draft
02	14/07/2023	Second version – review of report
1	17/08/2023	Final version

CONSORTIUM - LIST OF PARTNERS

Partner no.	Short name	Name	Country
1	FEHRL	FORUM OF EUROPEAN NATIONAL HIGHWAY RESEARCH LABORATORIES	Belgium
2	MTES	MINISTERE DE LA TRANSITION ECOLOGIQUE ET SOLIDAIRE	France
3	CERTH/HIT	CENTER FOR RESEARCH AND TECHNOLOGY HELLAS	Greece
4	CDV	CENTRUM DOPRAVNÍHO VÝZKUMU- TRANSPORT RESEARCH CENTER	Czech Republic
5	UGE	UNIVERSITÉ GUSTAVE EIFFEL	France
6	SPW	SERVICE PUBLIC DE WALLONIE – DIVISION MOBILITE – INFRASTRUCTURES	Belgium
7	UPGE	UNION PROFESSIONNELLE DU GENIE ECOLOGIQUE	France
8	UIC	INTERNATIONAL UNION OF RAILWAYS	France
9	CEREMA	CENTRE D'ETUDES ET D'EXPERTISE SUR LES RISQUES, L'ENVIRONNEMENT, LA MOBILITE ET L'AMENAGEMENT	France
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17	OFB	OFFICE FRANÇAIS DE LA BIODIVERSITE	France
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EXECUTIVE SUMMARY

The BISON project, funded by the European Union's Horizon 2020 research and innovation programme, is focused on tackling the research and innovation challenges related to biodiversity mainstreaming in the complete life cycle of transportation infrastructure. Project's main objective is to support European Member States, stakeholders, and associated countries by offering them recommendations and tools to integrate biodiversity considerations throughout the entire lifespan of transportation infrastructure, including planning, design, construction, and operation.

The objective of this deliverable is to present and demonstrate the need for creation of possibilities how the awareness of and the knowledge about the biodiversity protection and transport infrastructure. It is an ongoing challenge for many years and the rapid pace of road and railway connection development e.g. in the Alps and Carpathians, some of the most important strongholds of biodiversity in Europe, is alarming and underlining the need to improve the current state in form of research projects such as BISON. (Nearly every day we can see road kills during our commutes, and these are just the most visible signs of biodiversity losses. Climate change and its impacts on landscapes, regions and cities is chasing us and is reinforcing the current problems in the landscape and urban areas. We need to raise awareness about this topic among various stakeholder groups, including decision-makers and for experts who are working daily in their professional life with these challenges, we need to create a source for up-to-date and sustainable knowledge.) To deal with all challenges related to the harmonization of transport development with biodiversity protection needs interdisciplinary approaches, cross-sectorial policies and transnational collaboration. For all of them efficient access to relevant information is needed. The huge amount of data accumulated in different research projects makes it difficult. To provide awareness about their accessibility, structure, resources, relevance for different stakeholders and support efficient access to them is the main task for this deliverable. To contribute to achieving these objectives, the BISON E-learning platform is being produced and, in this deliverable, we would like to present its rationale, its structure and functioning and outline the next steps.

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1. INTRODUCTION

The BISON website (https://bison-transport.eu) will include the E-learning Platform which is an open access tool for all interested parties to access training/capacity building courses managed by the Slovak University of Technology in Bratislava (STUBA). It contains the data available at European and national levels including research, policies, legislation and different kinds of interactive data and e-learning materials based on deliverables produced in the framework of the BISON project. These materials are aimed at providing a platform where various stakeholders can access to find resources that will help them to learn more about the topic and increase their knowledge about biodiversity protection and transport infrastructure. The content of topics addressed by modules varies and the needs of diverse stakeholder group in accordance with the foreseen depth of their previous knowledge on the subjects as well as the level of details about specific topics differs reflecting the expected demands of the stakeholder groups' profile.

The BISON E-learning Platform is an inherent part of the dissemination and implementation activities of the project consortium. This project is focused on biodiversity and infrastructure synergies and opportunities for European transport networks. BISON addresses the whole scale of problems and challenges related to safeguarding and enhancing biodiversity on the European continent and supporting social and economic development through safe, efficient, and sustainable transport systems that are accessible and affordable to all citizens. To face these ambitious challenges, the awareness and cooperation capacities of all relevant stakeholders need to be developed. The BISON E-learning Platform aims to support this development by addressing key stakeholder groups identified according to their position in the process of developing, using, and maintaining biodiversity and transport or on their interest on specific issues concerning the harmonization of biodiversity conservation and transport development.

2. THE BISON E-LEARNING PLATFORM

Being aware about different knowledge background and capacities of stakeholders in different positions (professional planners, designers, decision makers, activists, researchers, teachers, etc.) to deal with the complex of relevant information for their active participation in the processes of sustainable transport development, the BISON E-learning Platform reflects the existence of different channels for conveying the information and creating proper environments for their synergy avoiding the overload and disorientation of the focuses. Complementarity of information provided, and avoidance of their inefficient overlapping is an essential part of the concept.

2.1. Objectives

- To raise awareness of the stakeholders about the need, potentials, and limits to harmonize the transport infrastructure and biodiversity protection.
- To develop user-friendly access to relevant information from BISON outputs addressing particular user's groups based on their interest in issues and/or on their belonging to stakeholders' group.
- To provide proper access to selected data for active engagement of stakeholder groups.
- To guide particular interest groups through the big pool of data and knowledge accumulated by BISON consortium.
- To interlink the BISON valuable outputs with the outputs from the other EU funded projects.
- To safeguard sustainable access to the know-how on harmonization of the transport infrastructure and biodiversity protection.

2.2. Approaches

- Raising awareness

Raising awareness through capacity building platforms can be an effective way to educate, engage, and empower individuals or communities. First step is to efficiently determine who you to reach with this topics. These groups are defined and mentioned in detail in the upcoming sections of this deliverable. This capacity building platform is an online e-learning platform that aligns with the target audience and BISON project goals. Setting measurable objectives that are following below will help guide the efforts and evaluate the effectiveness of this platform.

- User-friendly information relevancy

Facilitate networking and collaboration for more user-friendly information is another objective of this platform. Creation of opportunities for participants to connect with each other, fostering a sense of

community and collaboration. This can be done through networking sessions, peer learning activities, or group projects. Encourage participants to share their experiences, ideas, and resources.

- Data selection

Development of an engaging content is vital through the big pool of data. The content is aimed to be informative, engaging, and tailored to the specific target audience. This includes text, links to research both published and ongoing, videos, presentations, infographics, case studies, and interactive exercises. The upcoming variety of formats will cater to different learning styles and keep the users participants more interested.

An ongoing and open collaboration with experts and non-experts are aimed. Partnering with subject matter experts, individuals or organizations that have relevance, credibility and induce in the target area. Their endorsement or participation can help the data selection process efficiently.

- Active engagement of stakeholders

Utilization of interactive features besides the sole representation of textual information aims to increase the engagement of different stakeholders through the platform. Via making use of interactive features provided by the capacity building platform, there might be live Q&A sessions, discussion forums, group activities, or virtual simulations. Encouraging active participation fosters engagement and knowledge sharing among participants.

- Linking BISON outputs

Extending the reach of the BISON project's outputs with both previous and future research channels. Leveraging supplementary resources and links to online channels for the extension of the reach of this platform's goals.

- Sustainability of platform

Continuously monitoring the progress and impact of this platform via collecting feedback from users/participants and analyse this data to assess the effectiveness of the predefined efforts. This information and feedback system could make improvements and refine the approach of the capacity building, e-learning platform. Maintaining the engagement even after the campaign ends. Provide additional resources, follow-up webinars, or a platform for ongoing discussion. Keeping participants engaged over the long term increases the chances of sustained behaviour change and impact.

2.3. E-learning platform for different stakeholders

As an expert in the field of biodiversity protection, one can access many thematic blocks of knowledge on transport infrastructure and biodiversity protection. For experts, it is considered that their level of existing knowledge is broad, and they are looking for in-depth, specific information that was produced lately to expand their professional horizons. The platform is also suitable for non-biodiversity experts for several reasons. Experts working on issues not related to biodiversity are also provided with information to increase their awareness about biodiversity. Via this platform, it is planned to highlight the importance of biodiversity in developing transportation infrastructure and bring it more to the agenda, not only being suitable for fields of expertise, but also benefiting in the context of environmental impact and assessment.

The E-learning platform offers the possibility to select cross-fertilization of knowledge between different types of transport infrastructures since more than 70% of the knowledge apply from roads and railways which offers valuable input for other less considered types of infrastructures (e.g. waterways, powerlines or other). The E-learning platform is addressing different stakeholders/interest groups with clear targeting information set in two dimensions – division of stakeholders based on their role in transport infrastructure development and based on their interest on specific issues in the transport infrastructure development and biodiversity protection and enhancement. Based on this, the e-learning platform provides information in selective way in the blocks addressing the pre-defined stakeholders' groups (Figure 1).

Themes / Stakeholders	Technological Innovations in transport and biodiversity	Climate change, biodiversity and eco-connectivity	Transport development challenges for biodiversity	Strategic Environmental Assessment / Environmental Impact Assessment	Planning the infrastructure	Designing the infrastructure
EU and national level of government						
Regional and local governance						
Infrastructure management companies and authorities						
Planners, designers and infrastructure professionals						
Academia and scientific community						
NGOs and civil society						

Figure 1: Matrix of stakeholders' groups and themes for the E-learning platform

The content of the E-learning and proper methods to deliver selected information to specific stakeholders' groups and themes follows the logic shown below (Figure 2).

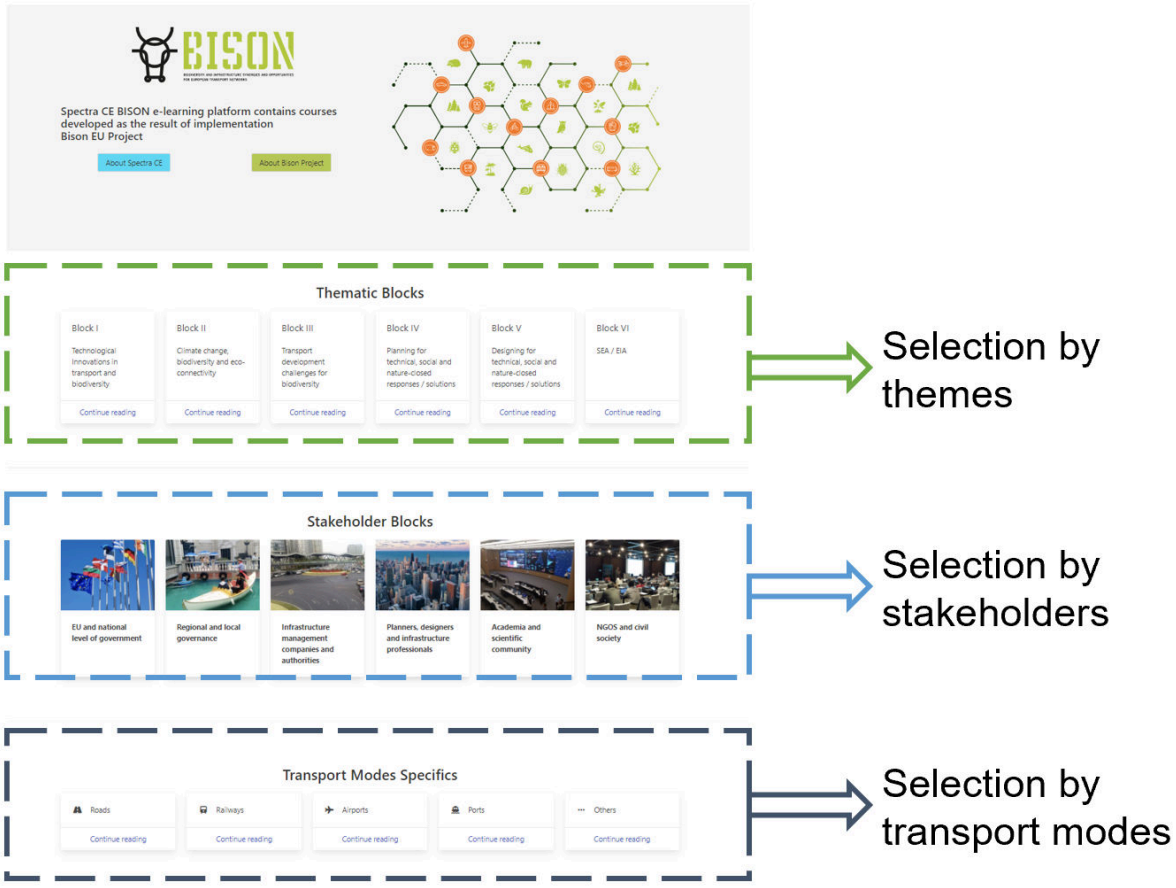

Figure 2. Various ways of selecting the content within the E-learning platform

2.4. BISON E-learning platform as a guide through big amounts of information

As shown in the Figure 3, the matrix involves both blocks of knowledge. For example, the module for Strategic Environmental Assessment (SEA) includes comprehensive knowledge on SEA related to transport and biodiversity protection. On the other hand, modules for NGOs include selected knowledge across all thematic blocks related to transport development and biodiversity protection addressing specifics of each theme relevant for NGOs. The goal is to have the content ready for a specific stakeholder block and provide them with enough information to increase their capacities and knowledge in the field of biodiversity protection and transport infrastructure to help them in their work and interests. Additionally, besides the information related to the topics of biodiversity protection and transport infrastructure, the aim of the platform is to inform the users about other ongoing projects that are dealing with similar topics (e.g., the INTERREG SaveGREEN Project and other). This matrix aims to explain the basic working principle of the e-learning platform. For technical from both transport and biodiversity - particularly practitioners working in infrastructure planning, design and operation- looking for more in-depth knowledge, it will also be possible to refer to the 'Biodiversity and Infrastructure. A handbook for action' website which will contain information about mitigation actions as well as solutions to be applied to all lifecycle of the infrastructure to avoid conflicts and provide benefit to biodiversity. It will also include

a ‘Glossary’ and a 'Transport Ecology Guidelines portal’ with access to publications and websites dealing with infrastructure and ecology.

The ambition of the BISON E-learning Platform is not to educate experts in dealing with the transport development of biodiversity protection, nor with their harmonization. The goal is to guide relevant stakeholders through huge amounts of information via sorting, interlinking, structuralizing, comprising, and prioritizing them in a user-friendly online environment. Each stakeholder will be guided through the line of most important information for one’s position or interest allowing one to use additional links to original knowledge resources for detailed research.

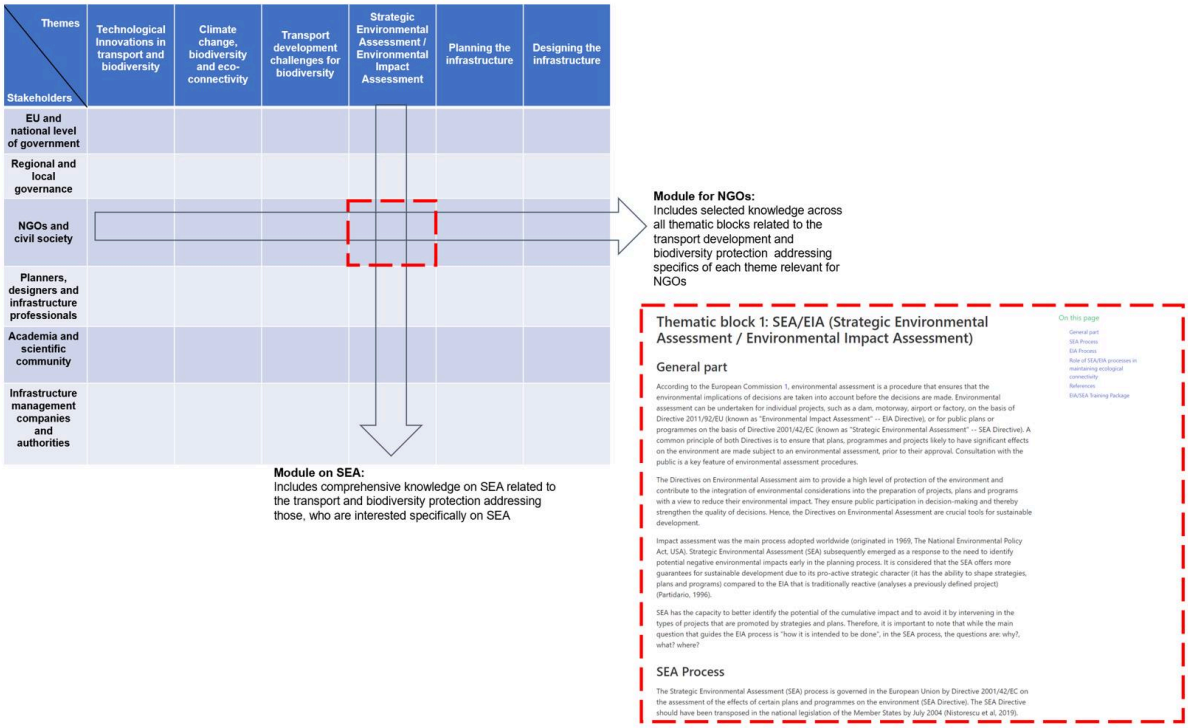

Figure 3. Thematic block SEA/EIA as an example

2.5. Online courses and best practices transfer

This platform will facilitate the connection and collaboration between transport experts and biodiversity experts in several ways. Firstly, the platform offer support for courses and programs launched by universities and other educational establishments that cover topics relevant to both fields, providing opportunities for experts to exchange knowledge, and learn from each other’s perspectives. Secondly, it has ambition to be further developed and launch online communities where experts can meet with each other, ask questions, and share resources. Thirdly, experts will have the possibility to participate in webinars or online events, which can serve as a platform for learning and exchanging insights. Lastly, experts can participate on creating and sharing the relevant and complementary content on the platform under the supervision and control of STUBA/SPECTRA, such as video lectures, blog posts, or podcasts, to connect with other learners and promote interdisciplinary learning. Overall, the e-learning platform can play a vital role in fostering collaboration and knowledge exchange between experts in different fields, including road and biodiversity experts.

The E-learning platform, in addition to the mediation of selected need-oriented information for stakeholders' groups, creates the integrative environment for access to the knowledge and best practices derived in the BISON project in the interaction with the knowledge available as the outputs from other EU funded projects such as INTERREG and HORIZON (e.g. TRANSGREEN, ConnectGREEN, SaveGREEN and INSPIRATION). The objective of this feature is raising awareness about public-funded activities on international and national levels and what are they dealing with to make the users familiar with the state of knowledge and project activities ongoing in the field of biodiversity protection and transport infrastructure. Many seemingly parallel activities are taking place and improving knowledge about them can foster synergies between them, becoming familiar with the state-of-the-art research and outputs of these projects that are dealing with similar topics. TRANSGREEN [4, 7], ConnectGREEN [4, 6, 8] and SaveGREEN [1, 2, 3, 5] is a set of three consecutive projects aimed at improving transportation infrastructure, land-use and landscape management in the mountainous regions of the Danube Basin, with a special focus on the Carpathian Mountains. This knowledge is transferable and should be actively used by other stakeholders, including users of the E-learning platform. In addition to the knowledge produced (deliverables, scientific papers, books, datasets etc.), these projects also produce and collect precious data that are stored online and can be further used by E-learning platform users. The goal of these projects is to develop safer and environmentally friendly road and rail networks by incorporating elements of Green Infrastructure and ecological connectivity elements. ConnectGREEN specifically aims to increase the capacity for ecological corridors identification and management to ensure ecological connectivity in the Carpathians by focusing on spatial planning as they key set of activities that can affect the projects and decision-making in the planning process. All projects provide valuable knowledge and experience to spatial planners and stakeholders to find the best ways to develop infrastructure while preserving wildlife conservation. These projects will also be linked to the INSPIRATION Horizon project, which aims to establish and promote the adoption of knowledge creation, transfer, and implementation for land-use, land-use changes and soil management as related topics to biodiversity to address current and future societal challenges. The methodology of INSPIRATION is based on a multi-stakeholder, interdisciplinary approach that involves public bodies, businesses, science, citizens, and society. INSPIRATION project was implemented in 2015 – 2018 and strongly contributed to the formation of the research agenda for the EU funding where the topic of biodiversity protection and transport infrastructure belong. By linking these projects and their achievements to the E-learning platform, we can contribute to proper utilization previously and parallel implemented activities, avoid duplication of the same work and, most importantly, take the results of these research activities further and produce knowledge of higher quality and better utility to the users.

2.6. Technical functioning

The e-learning system is a static web site created with Eleventy (https://www.11ty.dev/) static site generator. Eleventy excels at content-driven sites and is used by Google, Netlify, MIT, CERN, ESLint, and more. Static site generators (SSGs) are a type of web technology that allow developers to generate static HTML pages from source files, without relying on a backend or database. Here are some key characteristics of the technology:

- SSGs use templating languages to generate HTML pages from source files.
- The e-learning system uses Markdown as the default markup language for creating content.

- SSGs are modular, which means that they allow developers to add and remove features as needed. This makes it easy to keep the website lightweight and fast, by only including the necessary functionality.

- Because SSGs generate static HTML pages, they are fast to load. This improves the user experience and also help with search engine optimization.

- In addition to html file the e-learning system uses JavaScript for additional possibilities, for instance searching.

For building a web interface Bulma CSS framwork (https://bulma.io/) is used. Bulma is a free, open source framework that provides ready-to-use frontend components that can be combined to build responsive web interfaces. That means that the e-learning systems provides clear and nice interface for any device (desktop, tablet, mobile).

2.6.1. Repository

The repository of the online e-learning tool (Figure 4) is a centralized storage system that houses all the digital assets and resources used within the platform. It serves as a comprehensive library of relevant open-access materials, including content, files, project assessments, links to original sources and supplementary resources.

The repository is structured and organized in a user-friendly manner, allowing users to reach out either open-access resources or original source of the materials. The direct linkage to the original source provides updated knowledge when it is needed. The repository is aimed to be equipped with search functionality, allowing users to quickly locate specific resources based on keywords, tags, or metadata.

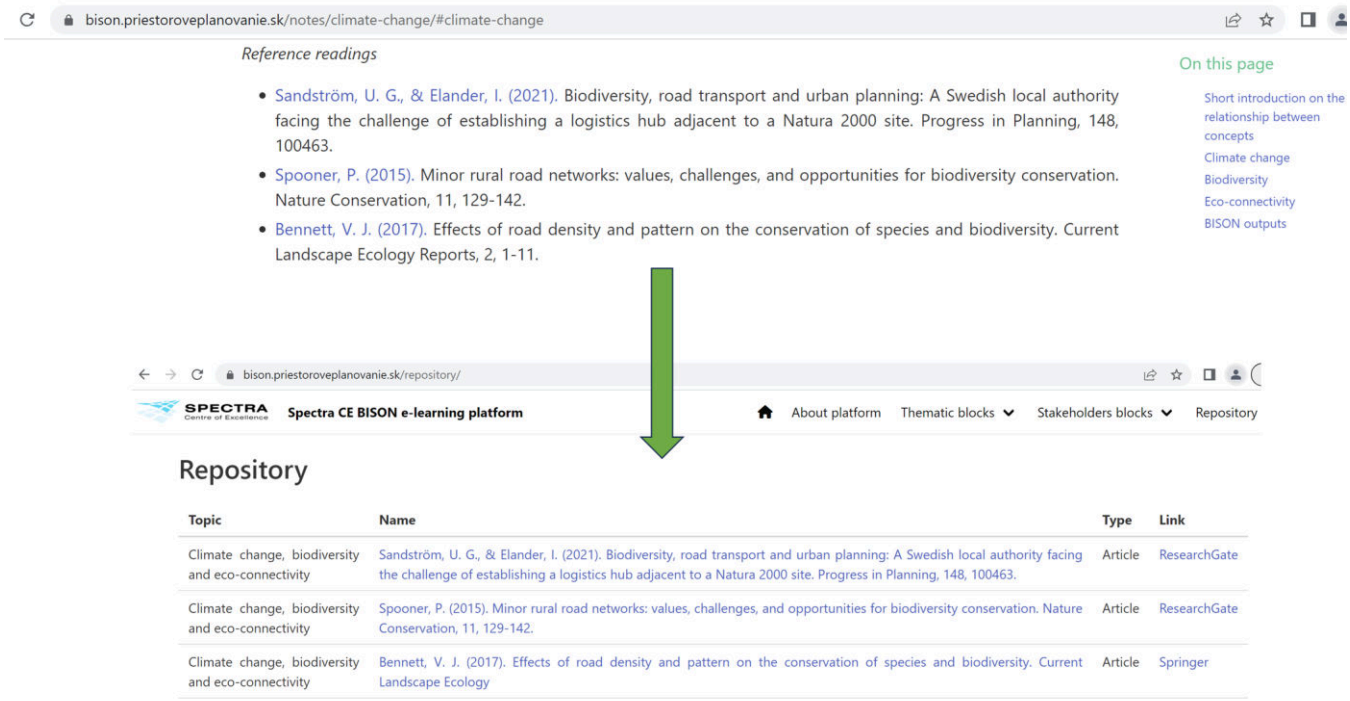

Figure 4. BISON E-learning Platform Repository Working Flow

Overall, the repository of the e-learning tool serves as a central hub of educational materials, promoting easy access, organization, and collaboration, thereby enhancing the online learning experience for both users and learners.

3. CONCLUSIONS

The e-learning platform developed meets the high standards for quality and user experience and is adding materials and information available from the BISON project and similar projects funded by the EU. The platform will be fully launched once all the BISON project outputs are finalized and available. Until then, the platform will continue to expand and update. The platform is aimed to be a sustainable and lively learning space and is supposed to be constantly complemented by latest knowledge and serve as a place where users can find all information related to biodiversity protection and transport infrastructure they need for their professional and personal interests. Pursuit of scientific knowledge is not a single procedure but is growing over time and so does the field of biodiversity protection and transport infrastructure. More and more transport infrastructure are being built or upgraded in Europe every day and the need for protecting biodiversity along the way, reinforced by climate change implications that are being more visible every year, is ever higher and increasing. With this platform, we hope to add another small piece of puzzle to the mosaic of solutions and ways to improve the status to improve the quality of life of us and of future generations.

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