



BioGov.net

Governance & Upskilling for a
Stronger Bioeconomy —

What's next for bioeconomy education? *VET and Life-long learning perspectives.*

29 October 2024



Agenda

Presentation of inspirational case studies and Education and Policy recommendations from EU funded projects and initiatives	<ul style="list-style-type: none">• BioGov.Net• Engage4Bio• Circular Bricks• Scientix• ICA-CoP Bio-Edu (ICA Community of Practice for Bioeconomy Education)
Interactive Discussion	<p>Co-Creation of Educational Recommendations (target Educational community): For formal, non-formal and informal education (including Awareness and Education). Collaboratively develop through a MIRO exercise, already pre-filled with the contributions from the inspirational case studies to develop recommendations to be taken up by the educational community.</p> <p>Co-Creation of Policy Recommendations (target Policy Makers): Collaboratively develop through a MIRO exercise, already pre-filled with the contributions from the inspirational case studies policy recommendations for sustainable bioeconomy education governance models at the European level. This involves sharing and discussing best practices, innovative policies, and regulatory measures to boost bioeconomy education in formal, non-formal and informal education.</p>
Closing remarks	Wrap up and conclusions

BioGov.net project in a nutshell

BioGov.net aims to **identify innovative training solutions in the bioeconomy**, with a particular focus on VET and Life-Long Learning.

In the methodology developed by the project, **humanities, art, design and culture are linked to bioeconomy education** to foster the transition towards an innovative, just and inclusive bioeconomy.

8 Communities of Practice



Interactive icebreaker!

BioGov.net

Selenia Marinelli – FVA New Media Research

Educational Recommendations

- **Public Awareness and Engagement:** Broader public education initiatives should be implemented to raise awareness of bioeconomy concepts and their societal benefits. **From early education to lifelong learning**, promoting **environmental literacy and bioeconomy awareness** is key to foster a well-informed society.
- **Curriculum Modernization:** Educational systems should integrate bioeconomy topics into existing subjects **across all levels, focusing on holistic, circular, and regenerative production models**. Special attention should be given to **cross-disciplinary knowledge, blending environmental sciences, technology, arts, economics, and policy**.
- **Focus on Transversal Skills:** Bioeconomy education should prioritize the development of transversal skills such as **critical thinking, entrepreneurship, and systems thinking**. These skills are essential to meet the complexity of bioeconomy sectors.
- **Inclusion and Accessibility:** Educational programs must be inclusive, with **tailored formats to meet the needs of marginalized or disadvantaged groups**. Ensuring accessibility to bioeconomy education for all learners can **help integrate underrepresented populations into the workforce**.

Educational Recommendations

- **Mapping and Collaboration:** Educational institutions should engage in systematic mapping **of available resources and training programs to address regional needs more effectively**. Continuous networking between educators, policymakers, and industry is crucial **to drive innovation and ensure curricula meet market demands**.
- **Innovative Teaching Approaches:** Educators should adopt innovative methods, such as **arts-based methods, e-learning and experiential learning to engage students** with real-world bioeconomy applications. Flexibility in learning formats, including project-based and hybrid approaches, coaching instead of formal teaching and collaborative learning. This **responds to diverse learner needs, promoting active, student-centered learning models**.
- **Train-the-Trainers and Lifelong Learning:** Continuous professional development for educators is necessary to **respond to the evolving needs** of the bioeconomy sectors. Teacher training programs should foster **interdisciplinary teaching methods**, while lifelong learning and certification programs should support trainers and trainees in maintaining **up-to-date skills**. Emphasis on **certifications such as micro-credentials and shorter educational tracks** reflects a growing demand for more flexible and accessible learning pathways.

Educational Recommendations

- **Practical Experience and Industry Collaboration:** Strong partnerships between educational institutions and industry are essential to **provide students with hands-on learning opportunities, including internships, fieldwork, and collaborative projects.** Emphasis should be placed on practical, real-world challenges to better **align education with labor market needs.** Need to break down silos between academic institutions, vocational training centers, and industry.
- **Continuous monitoring and evaluation of educational interventions** is essential for improving engagement, especially with private sector partners. The educational community should **promote the regular assessment of bioeconomy education programs to ensure they remain relevant and effective.**

Education case study

[My HandScript](#) - Migrants Hands and Skills to Create a Future Track

Implemented in: Italy, UK, Cyprus, Greece, Lithuania



MyHandScript
Migrants' Hands & Skills to Create a Future Track

Description and Objective of the Educational Format:

It was a 30-month project aimed to develop and test an **innovative education and training programme for low-skilled adults and migrants** (especially newly arrived migrants, asylum seekers and refugees) to support their social and economic integration into society and the labour market, **boosting cooperation and networking among and between local handcrafters, artists, migrants and refugees.**



Scope of the Educational Format:

- Design of a collaborative e-learning platform
- Development of an e-educational programme to improve the basic skills and key competences of migrants and their up-skilling and re-skilling in the realms of handicraft, culture and arts by also involving local handcrafters
- Development of a [handbook](#) to support adult educators working with migrants
- Organisation of MyHandScript forums & festivals in each country



[Discover here](#) all the 20 case studies in education mapped by BioGov.net in the 8 CoPs.

My HandScraft

Key features:

- Cooperative and Peer to peer learning
- Experiential learning and Learning through Art

Specific Skills and Competencies Addressed:

- **Technical competencies** to work in the handicraft sector
- **Transversal competencies:** critical thinking and problem-solving, communication, relationship skills, marketing competencies, entrepreneurial competencies and develop a passion for work, patience, courage, curiosity, accuracy and time management.
- **Valorisation competencies:** knowledge of the local language, knowledge of the local culture and system, personal training and career development



Policy Recommendations

- **Strategic Policy Integration:** Bioeconomy education should be integrated as a **key element in national and regional strategies**, including sustainable development, industrial policy, and circular economy initiatives. Policymakers should adopt a **multi-ministerial approach to ensure cross-sectoral collaboration and coherence**.
- **National and Regional Data Collection:** Systematic data collection on available bioeconomy training programs and resources is necessary for **better strategic planning**. Policymakers should **ensure that educational institutions and local authorities collaborate to map regional needs and identify gaps in bioeconomy education, to promptly respond to labor market evolving demand**.
- **Inclusive Policy Measures:** Bioeconomy policies and initiatives addressing the **needs of disadvantaged and marginalized groups should be aligned to ensure equitable participation** in the bioeconomy, maximising the opportunities for **inclusive growth**.

Policy Recommendations

- **Monitoring and Skill Alignment:** Continuous **monitoring of labor market** trends and aligning educational programs with market demands are essential **to bridge skill gaps**. The usage of tools like dashboards for monitoring was suggested **to ensure data-driven education policy**.
- **Stakeholder Engagement and Interdisciplinary Collaboration:** **Policymakers** should foster **stronger partnerships between public institutions, academia, and industry** to support the development of bioeconomy sectors. Engaging stakeholders in defining educational priorities is crucial for skills with labor market and societal needs.
- **Supportive Networks and Structures:** Creating networks and associations focused on bioeconomy can enhance collaboration, knowledge exchange, and professional growth. **Policies should support the establishment of observatories and platforms** that monitor local bioeconomy developments and provide **evidence-based guidance for future initiatives**.

Policy Recommendations

- **Funding and Financial Incentives:** More financial resources should be directed **towards bioeconomy education, research, and development projects**. This includes **simplifying legislative processes to unlock funding for smaller, local initiatives and providing financial incentives** to promote participation in bioeconomy-related programs.
- **Work Experience and Vocational Training:** Policy measures should **encourage the inclusion of practical training and work experience programs** that connect students with industries in the bioeconomy. Such initiatives, including subsidized internships, should be supported.

Policy case study

National Bioeconomy Coordination Board in Italy

Objectives:

- **To guarantee an effective synergy** between national, regional and local public administrations and the National Technology clusters operating in the bioeconomy, reducing duplication and fragmentation.
- **To facilitate and monitor** the implementation of the National Bioeconomy Strategy in all Italian territory and to progressively propose measures and actions to make the development of the bioeconomy locally more precise and effective, in particular from the economic, environmental and social points of view;
- **To ensure the coordination** of public policies, taking into account the indications of the EU Union.
- **To ensure the alignment** of the national **STRATEGY BIT II** with the European one



Italian Committee for Biosafety, Biotechnology and Sciences of Life

Presidency of the Council of Ministers

National Bioeconomy Coordination Board - NBCB

- Ministry of the Agriculture, Food Sovereignty and Forestry
- Ministry of University and Research
- Ministry of Education and Merit
- Ministry of the Environment and Energy Security
- Ministry of Business and Made in Italy

- Expert Permanent Conference of State-Regions
- Expert Commission Economical Development, Regions and autonomous Provinces
- Expert Commission Agriculture Policies, Regions and autonomous Provinces

- Institute for Environmental Protection and Research – ISPRA
- Association for the Development of Industry in Southern Italy – SVIMEZ
- National Technology Cluster CL.A.N. (Agrifood)
- National Technology Cluster SPRING (Green Chemistry Circular Bioeconomy)
- National Technology Cluster BIG (Blue Italian Growth)
- National Technology Cluster Forestry Wood Italy

National Bioeconomy Coordination Board in Italy

Key features of the Implementation Action Plan:



- Bioeconomy education is tackled with a **holistic approach** involving Ministries with different agendas
- A consultation with the National Bioeconomy Coordination Board took place in May 2024, involving BIObec, BioGov.net, GenB, Engage4BIO and EuBioNet, to ensure that **EU funded projects' outcomes are taken into consideration for the revision of the educational aspects in the National Bioeconomy Strategy**

IMPLEMENTATION ACTION PLAN (2020-2025) FOR THE ITALIAN BIOECONOMY STRATEGY BIT II



[Link to the document](#)





Engage4BIO

Educational guidelines for Regional Hubs to support bioeconomy practices

BioGov.net Workshop

What's next for bioeconomy education?
VET and Life-long learning perspectives

29 October 2024

Viola Pinzi

European Association for the Education of Adults

Engage4BIO process to develop recommendations

Co-creation guidelines

Map and gap analysis

By April 2023

Co-creation workshops

4 Models

April-December 2023

Implementation
in context with stakeholders
WP3

WPI
Framework
+
Catalogue

1

Vision and
strategy
Pathfinder
Manual

2

Guidelines for
training and
mentoring for
skills
development

3

Awareness and
Knowledge Gain
Campaigns

4

Innovative
Governance
models



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Educational recommendations - 1

Definition process for educational recommendations

- Start with a detailed and contextualized map and gap analysis (situated learning)
- Identify clearly the need/problem to tackle by the new/improved educational plan/strategy.
- Co-create the educational recommendations and concrete training and learning opportunities with all relevant stakeholders, depending on the level of implementation (local, regional, national etc.).
- Maintain an interdisciplinary and holistic perspective to foster a comprehensive understanding and engagement with the multifaceted aspects of the bioeconomy.

Map and gap analysis results > example of Engage4BIO

- Education activities with specific attention to the bioeconomy are very limited, both for formal and informal education.
- Opportunities are seen, also as problem-driven learning communities and living labs, with approaches that are creative and flexible.
- Need to start with the education activity that seems the most significant for the local contexts, in order to stimulate further development of the bioeconomy practices.

Educational recommendations - 2

Content and scope of activities

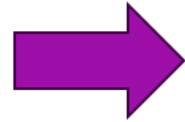
- Maintain a holistic approach in terms of topics and learning outcomes.
- Identify the most valuable action and entry point in the local ecosystem to support further uptake of bioeconomy practices.
- Include the core principles of bioeconomy as well as circular economy, together with main opportunities for innovations and existing challenges, also in the broader picture of sustainability.
- Embed aspects of awareness raising and focus on experiential instructional design, in terms of methods.

Collaborations and audience

- As per the design of the activities, focus on collaborations that are directly linked to the main learner's group and to the core topic of the training, for example in a pairing between educational institution, and stakeholders in the ecosystem.
- High level of flexibility when it comes to main audiences to engage with is also an important aspect.
- These two aspects should be strongly related to the contextual needs analysis.

Education case study – Italian Regional Hub

Guidelines for training and mentoring for adults including skills development



University of Palermo

Co-creation of training

Hybrid - 4 hours
n. 36 participants

Three pillars of sustainability (environmental, social and economic)

Involving experts in the scientific sector, secondary school teachers and blue biotech enterprises in training courses

Training activity

Training course for secondary school teachers: adult education and skills development on the Blue bioeconomy

Purpose

To foster and support their role of inspiring young students toward the development of blue bioeconomy competencies and skills.

Expected results

Update on topics related to the marine sustainability, sustainable use of its resources, valorisation of local production and circular economy paths.

Participants

- 6 secondary schools from different curricula (hospitality, classic and scientific, economic and technological, communication and design food technology)
- n. 48 high school teachers took part in training activities.



Education case study – Italian Regional Hub

Type of activity

Seminars and workshops

Contents to be transferred

- correlation between sustainable use of marine resources and product quality, nutritional value to the consumer and importance to the local economy
- sustainable use of marine resources in fisheries, aquaculture, integrated multi-trophic aquaculture and implementation strategies
- valorisation of by-products obtained in fish processing chains in other production sectors (pharmaceutical, cosmetic, nutraceutical) for the implementation of circular economy paths

Structure and timeline

Main activities: April-September 2024

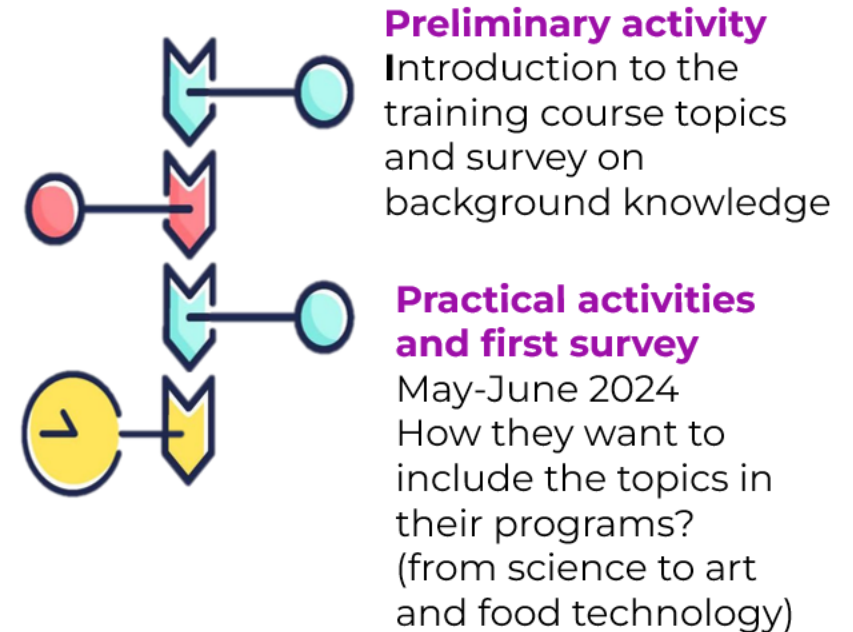
Follow-up: October 2024 to February 2025

Seminars and workshops

April – May 2024

Follow-up and final evaluation

October 2024 to February 2025





Launch of a training course for skills development on the blue bioeconomy

- ❖ Training for secondary school teachers from 6 educational institutions in the province of Trapani on blue bioeconomy and blue growth at a regional scale

- To encourage the integration of the blue bioeconomy topic in future educational pathways
 - To contribute to the creation of new professional *curricula*



Cos'è il Programma Europeo Zero waste?

No Non saprei Non so Ne ho sentito parlare

La tendenza al "rifiuto zero"

Conosci prodotti marine biobased?



Lo scarto della filiera ittica è un rifiuto?



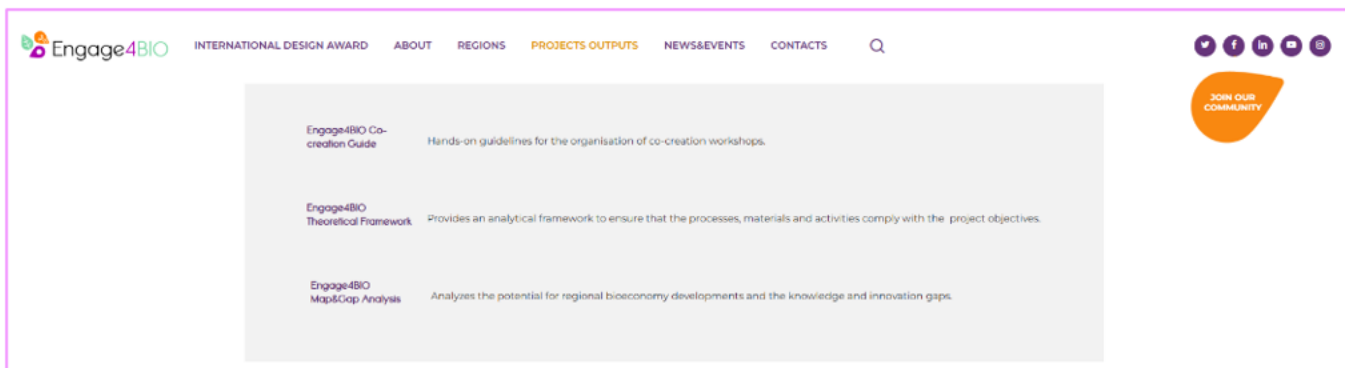
Guidelines for Hubs co-creation workshops

The purpose of this document is **to provide the Engage4BIO Hubs with hands-on and easy to follow guidelines and suggestions for the organisation of 4 series of co-creation workshops.**

Key areas

- 1) Conceptual aspects and methods
- 2) Stakeholders recruitment
- 3) Workshop organisation
- 4) References
- 5) WS concepts and Templates.

Link: <https://www.engage4bio.eu/projects-outputs>



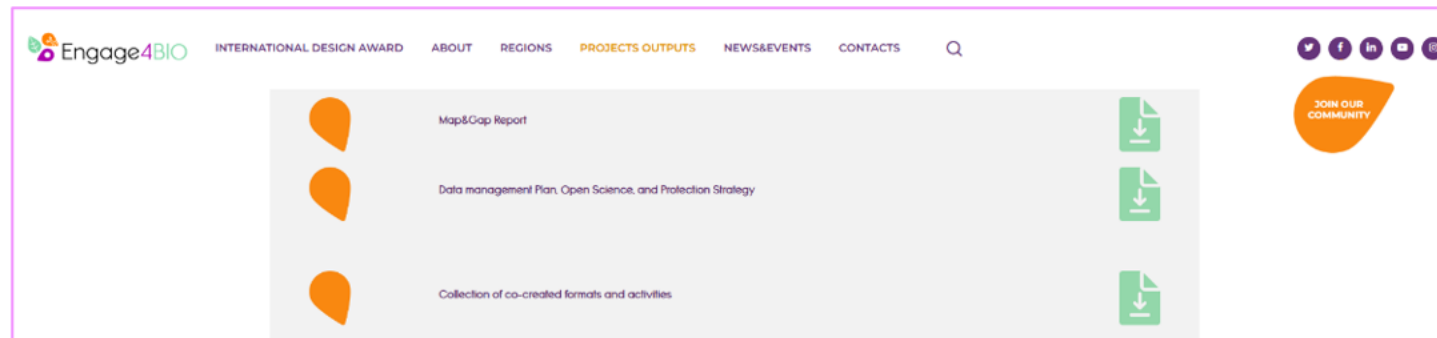
Collection of co-created formats and activities

This Engage4BIO report presents the **results of the four co-creation tasks carried out by each Hub (Austria, Finland, Hungary, Italy, and The Netherlands), in order to engage with quadruple helix stakeholders at the local and regional level and involve them in a co-design process.**

Key results

- 1) Co-creation processes in 5 Regional Hubs and lesson learnt
- 2) Pathfinder Manuals: vision and strategy
- 3) **Guidelines for training and mentoring activities**
- 4) Knowledge gain, awareness raising and communication campaigns
- 5) Innovative governance models

Link: <https://www.engage4bio.eu/projects-outputs>



“This is Bioeconomy” International Design Award

The Engage4BIO project is proud to officially launch its Design Award!

WHAT IS THE ENGAGE4BIO INTERNATIONAL DESIGN AWARD?

Engage4BIO set up the International Design Award to search innovative bio-based solutions that highlight the potential of biodesign in creating sustainable futures.

Through the contest, we seek to recognize and reward the most innovative and impactful designs that address environmental challenges and drive the transition to bioeconomy.

Join the solution at <https://www.engage4bio.eu/this-is-bioeconomy-international-design-award/>



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the European Union



www.engage4bio.eu



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#ENGAGE4BIO



Thank you for your attention!

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Circular Bricks

Nadia Sansone

Educational Recommendations



Whatever the chosen knowledge-domain, **we need to ensure that students acquire useful skills**

- Productive participation in the emerging innovation-driven knowledge-creation society, one that is oriented **toward building a sustainable future**, requires cultivation of sophisticated innovative competencies (Bereiter, 2002; Paavola & Hakkarainen, 2014).
- To facilitate **knowledge-creating competencies**, students need to encounter the complexity of the real-world, pursue various types of authentic activities, learn how to act and work effectively, individually or together with others, and solving complex problems

Shifting paradigms, **from book-oriented to task & activity-oriented approach**

- From Confucius to Dewey: activities, tools and interaction with peers are the cornerstones around which to rotate the organization of **rich and complex teaching environments**, able to support a meaningful and situated learning, in which to do real life experience
- Learning by Doing enables learners to develop new skills: through practical, concrete and real activities, students are called upon to field **higher mental functions**, not to mentions social, relational and communication skills

Education case study



Circular Bricks spreading creativity and sustaining socio-relational skills

- As part of the project, about one hundred students from participating VET schools (Italy, Greece, Romania, Spain) were involved in activities based on the **Design Thinking** (Brown, 2009) approach with the aim of producing sustainable entrepreneurial ideas related to the bio-economy.
- During the activities, students worked following the principles of the **collaborative approach** (Vygotsky; Johnson & Johnson, 1999) and were divided into groups with specific roles (brainstorming, research, ideation, production, presentation). They eventually generated projects that were then submitted for evaluation by experts and **peer-evaluation**.
- Overall, **the activities stimulated a range of key skills, knowledge, and attitudes**: critical thinking, creativity, collaboration, effective communication.

Policy Recommendations



To ensure students are equipped with essential skills, an **effective train-the-trainers approach is needed**—one that emphasizes practical, hands-on learning, supported by thoughtfully designed technology integration.

- By designing a **kind of teaching that is both transmissive and interactive**
- By using appropriate technologies (Learning Management Systems, Webapps, digital tools) **to enhance active and trainee-centered teaching & learning**, whether the technology supports face-to-face (f2f), blended or fully online pathways.

Teachers should not have to fend for themselves: A **partnership** is needed between educational research and practicing teachers

- Equipped with both the wisdom that teachers have developed across many **years of teaching experience and with the scientific knowledge developed by the academic community**, the opportunity arises to enhance teaching practices and help young people to develop a healthy relationship with this world we are living in
- Meaningful opportunities to increase teachers' confidence in their own abilities are possible when training paths allow teachers to **reflect and participate actively in the construction of their own understanding** on educational issues within a community of practice

Policy case study



Circular Bricks as an incubator of active training and a community of practice

- At the beginning of the project, significant attention and time was devoted to a **blended training program** in which teachers from the participating schools were trained in relevant methodologies and technologies.
- Through **4 full days of practical activities and group work**, themselves based on Design Thinking (so that it could be later introduced in the classroom), teachers had the opportunity to experience collaborative work and initiate the building of a community of practice that transcends disciplinary and geographical boundaries.
- This community was **further strengthened by the co-creation of a teacher toolkit**, designed and promoted by the participants themselves, which gathers effective tools and practices to be shared within and beyond the project's context.



SCIENTIX[®] & Environmental sustainability

The community for science
education in Europe

Eddy Grand-Meyer, Outreach and Engagement Specialist (STEM)

Scientix[®] is an initiative of





**NBS
EduWORLD**

Education case study

NBS EduWORLD is at the crossroads between nature-based solutions and education. It brings together researchers, educators, NBS practitioners, Edutainment specialists and even sports community members with the common goal of creating engaging and locally relevant educational materials on the environmental, social, and professional merits of NBS.

The **NBS Initial report on NBS in Higher Education** includes principles, NBS content, pedagogy, gaps, and priorities for NBS in higher education and entrepreneurship architecture.



- ✓ Develop Interdisciplinary programs to foster holistic understanding of NBS and encourage collaboration among students and faculty from different disciplines
- ✓ Foster collaboration with communities to identify and implement NBS that addresses local environmental challenges.
- ✓ Integrate impact assessment and modelling into curriculum design. This is a real priority for vocational and entrepreneurial education where the financial analysis of NBS is critical for both project and integrating the concept into organisations.



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<https://nbseduworld.eu/>

Policy Recommendations

How to support policy stakeholders with our work?

Findings from the GenB workshop with the Scientix® MoE STEM Representatives Working Group

- Specific policy recommendations must coincide with curriculum reform to be actionable
- Background information about the topic, policy landscape and curriculum analysis are useful components to support policy stakeholders
- Supporting the dissemination of tools and CPD offering for teachers is also an objective for policy stakeholders
- Policy stakeholders also need concise summaries to quickly assess the value of the information, where to forward it, to whom, etc.

POLICY DOCUMENTS with Scientix®: How much information is needed for policy support?

REPORT ON POLICY RECOMMENDATIONS

- 10+ pages
- In-depth overview of topic and pedagogies that support the project and its activities
- Overview of current policy landscape
- Detailed methodology and account of data collection
- Additional information about related project activities
- In context policy recommendations and advice

- **Detailed background information**
- **Contextualised policy implications (EU)**
- **Full methodology account**
- **Provides the fullest picture**
- **Long and information-rich**

POLICY BRIEF

- 5-6 pages
- 'Template' provided by EC with set headings but flexible content
- Brief overview of topic and current policy landscape
- Basic account of methodology
- Broad policy recommendations and implications

- **Limited background information**
- **Concise summary of background and methodology,**
- **Contextualised policy implications (EU)**
- **Text-based template**

POLICY DIGEST

- 1-2 pages
- Synthesised information
- Visual & Accessible
- Limited background
- No methodology account
- Paraphrased and combined policy recommendations

- **Basic background information**
- **No detailed summary of background nor account of methodology,**
- **Focused on simplified policy recommendations**
- **Visual and accessible**

Lifelong learning at CoP Bio-Edu

Han van Osch

Educational Recommendations

- Lifelong learning is a way of life.
- Lifelong learning is a societal issue
- The industry perspective should be the starting point of the offer in lifelong learning.
- Outside-in thinking is still very weak within educational institutes.
- Microcredentials are a good tool to make courses of 1 to 30 ECTS available.
- Lifelong learning is a new business model for many knowledge institutes
- Educational institutes are initially bringing formal education to the public.
- Non-formal and and informal education could also be included in the offer. Think of learning communities.

Educational Recommendations

- Cooperation between all parties is crucial
- E-learning is a good opportunity to reach out to a bigger audience.
- Adapt to the specific contexts that the participants bring in.
- Also within the universities cooperation is essential. Internal competition is a threat.
- It all start at the age of primary education.
- The biggest challenge is to change the learning culture in society as a whole.
- Lifelong learning demands a paradigm shift

Policy Recommendations

- For industry: If you do not change the attitude in the learning culture, you will fall behind
- For the EU: Lifelong learning is crucial, so put it in the next calls as a specific topic.
- Realize funding opportunities on regional, national and international level.
- Take responsibility to realize platforms for cooperation

Interactive sessions!

[LINK to Miro](#)