

Brussels, 19 May 2025

COST 015/25

DECISION

Subject: Memorandum of Understanding for the implementation of the COST Action “Building Education and One Health with Adaptive Convergence and Open Networks” (BEACON) CA24106

The COST Member Countries will find attached the Memorandum of Understanding for the COST Action Building Education and One Health with Adaptive Convergence and Open Networks approved by the Committee of Senior Officials through written procedure on 19 May 2025.

MEMORANDUM OF UNDERSTANDING

For the implementation of a COST Action designated as

COST Action CA24106
BUILDING EDUCATION AND ONE HEALTH WITH ADAPTIVE CONVERGENCE AND OPEN
NETWORKS (BEACON)

The COST Members through the present Memorandum of Understanding (MoU) wish to undertake joint activities of mutual interest and declare their common intention to participate in the COST Action, referred to above and described in the Technical Annex of this MoU.

The Action will be carried out in accordance with the set of COST Implementation Rules approved by the Committee of Senior Officials (CSO), or any document amending or replacing them.

The main aim and objective of the Action is to Education nowadays often lacks the integration of One Health principles, technological access for all students, and the emphasis on global collaboration needed to tackle the pressing issues of today's world. The BEACON Action aims to set a new gold standard in health education for high school students across Europe.. This will be achieved through the specific objectives detailed in the Technical Annex.

The present MoU enters into force on the date of the approval of the COST Action by the CSO.

OVERVIEW

Summary

The BEACON Action aims to set a new gold standard in health education for high school students across Europe. This collaborative initiative unites interdisciplinary experts and stakeholders to develop an innovative educational platform that promotes well-being, diversity, mutual respect, and understanding among students. Structured around five key groups, BEACON seeks to empower students to become informed and healthy members of a global community, capable of tackling both local and individual challenges. The initiative aspires to inspire a proactive generation of young individuals who will not only improve their own lives but also contribute positively to the well-being of their communities. By leveraging cutting-edge technology and engaging local experts to address specific local issues while maintaining a focus on global challenges, BEACON will significantly enhance health education not just in Europe, but also in other regions around the world. Through its comprehensive approach, the BEACON Action is positioned to create lasting impacts on health education and community health outcomes globally.

<p>Areas of Expertise Relevant for the Action</p> <ul style="list-style-type: none"> ● Health Sciences: Health services, health care research ● Educational sciences: Education: training, pedagogy, didactics ● Sociology: Social structure, inequalities, social mobility, social exclusion, income distribution, poverty ● Health Sciences: Public and environmental health ● Other engineering and technologies: Ethics of other engineering and technologies 	<p>Keywords</p> <ul style="list-style-type: none"> ● Health education ● One health ● Education technologies ● Well-being ● Global challenges
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Specific Objectives

To achieve the main objective described in this MoU, the following specific objectives shall be accomplished:

Research Coordination

- Establishing Research Priorities: BEACON will define key research priorities focused on integrating AI-powered tools and immersive technologies into middle school One Health curricula.
- Facilitating Interdisciplinary Collaboration: BEACON will promote collaboration among experts from fields like education technology, public health, veterinary sciences, environmental studies, and AI ethics, ensuring a comprehensive approach to the challenges of One Health.
- Developing a Data Sharing Framework: a data-sharing framework will be established to enable effective use of research findings and educational tools across BEACON’s partner network, promoting transparency and collaboration
- Standardizing AI Evaluation Methods: BEACON will develop standardized methods to evaluate the effectiveness of AI tools in personalizing learning and improving One Health education outcomes, ensuring consistency across different contexts.
- Ensuring Ethical Research Practices: ethical implementation of AI will be prioritized, ensuring compliance with data privacy laws, addressing algorithmic bias, and promoting equitable access to learning tools.
- Monitoring Research Impact: continuous monitoring with Key Performance Indicators (KPIs) will measure the impact on student outcomes, teacher adoption, and accessibility, ensuring BEACON remains responsive to evolving needs.
- Building Research Capacity: BEACON will support capacity building through fellowships, workshops, and exchanges, particularly in regions with limited access to advanced educational tools, fostering long-term sustainability

Capacity Building

- **Enhancing Educators' Technological Proficiency:** BEACON will provide training for educators to integrate AI and immersive technologies (AR/VR) into classrooms, covering AI literacy, AR/VR applications, and technology management.
- **Developing Localized Curriculum Integration:** educators will receive support to align AI and One Health education with local curricula through customizable learning modules and guidance for adapting content to diverse cultural contexts, with low-tech options for underserved schools.
- **Building Student Competencies in One Health and AI:** students will develop critical thinking, problem-solving, and digital literacy while learning to use AI tools in real-world One Health applications, encouraging cross-cultural collaboration.
- **Supporting Disadvantaged Schools and Students:** BEACON will ensure equitable access by offering funding, scholarships, and offline learning tools to schools and students with limited resources.
- **Creating a Global Community of Practice:** a global community will be fostered through online workshops, mentorship programs, and a shared resource repository to facilitate continuous knowledge exchange.
- **Fostering Leadership and Sustainability:** emerging leaders within schools will be trained to advocate for AI in One Health education, ensuring the initiative's scalability and sustainability beyond its lifecycle
- **Supporting Research and Professional Development:** continuous professional development will be provided through Short-Term Scientific Missions (STSMs), workshops, and research fellowships, supporting expertise in One Health education and AI.
- **Monitoring and Assessing Capacity-building Impact;** a monitoring framework with Key Performance Indicators (KPIs) will track improvements in educator skills, student outcomes, and institutional readiness, ensuring continuous feedback and improvement.

TECHNICAL ANNEX

1. S&T EXCELLENCE

1.1. SOUNDNESS OF THE CHALLENGE

1.1.1. DESCRIPTION OF THE STATE OF THE ART

Students today face an era defined by unprecedented global challenges—climate change, geopolitical instability, deepening inequalities, poverty, and shifting demographics. These interconnected issues affect both their local environments and the wider world they will inherit. Traditional education systems increasingly struggle to equip students with the skills, knowledge, and global perspectives necessary to navigate these complexities.

There is an urgent need for a new educational paradigm that goes beyond academic excellence, focusing on social responsibility, peace-building, conflict resolution, poverty eradication, and health equity. This paradigm must enable students to engage with local and global determinants of health, economic disparity, and environmental sustainability. Importantly, it must empower students to contribute actively to solving these challenges.

Middle school is a critical developmental stage for students (ages 11-14), where they cultivate critical thinking, problem-solving skills, and a broader awareness of global issues. This period of cognitive and social development makes them particularly receptive to interdisciplinary frameworks like One Health, which emphasizes the interconnectedness of human, animal, and environmental health. Such frameworks are crucial for helping students understand and address challenges related to health equity, environmental sustainability, and social justice.

Education nowadays often lacks the integration of One Health principles, technological access for all students, and the emphasis on global collaboration needed to tackle the pressing issues of today's world. Moreover, the widening digital divide prevents equitable access to educational technologies, leaving underserved regions at a disadvantage. Despite major strides in advancing the state of the art in capabilities and know-how, the need for implementation in educational settings remains unfulfilled.

1.1.2. DESCRIPTION OF THE CHALLENGE (MAIN AIM)

The BEACON action aims to address the critical challenge of preparing middle school students to understand and respond to the intricate interconnections between human, animal, and environmental health, central to the One Health concept. In a world increasingly affected by global health crises, climate change, biodiversity loss, and social inequalities, BEACON seeks to equip young learners with the skills, knowledge, and perspectives needed to tackle these complex and interconnected issues.

The primary goal of BEACON is to leverage adaptive technologies, including Artificial Intelligence (AI) and immersive tools such as augmented reality (AR) and virtual reality (VR), to enhance One Health education for middle school students. By using these technologies to aid in automated translation and other distant cooperation requirements, the action aims to provide students with challenge-driven learning experiences that are engaging, personalized, and adapted to their specific educational needs.

BEACON's broader ambition is to transcend traditional classroom boundaries, fostering global collaboration and cultural understanding among students. Through immersive learning environments and real-time cross-border cooperation, students will explore global health challenges such as the spread of zoonotic diseases or the impacts of climate change, fostering not just academic proficiency but empathy and a sense of global citizenship.

BEACON is dedicated to closing the expanding technological gap by ensuring that all students, particularly those from underserved and disadvantaged backgrounds, have equal access to the adaptive technologies and learning tools essential for their success. This commitment to inclusivity lies at the heart of BEACON's mission to empower all learners to become proactive, responsible citizens. By equipping them with the resources needed to tackle global challenges, BEACON supports the

preservation and development of One Health while fostering effective teaching practices.

1.2. PROGRESS BEYOND THE STATE OF THE ART

1.2.1. APPROACH TO THE CHALLENGE AND PROGRESS BEYOND THE STATE OF THE ART

The BEACON action offers a groundbreaking approach to One Health education by transforming middle school curricula through the integration of AI-powered tools and immersive technologies. Its strategy goes beyond traditional educational methods, focusing on three key areas: technology integration, global collaboration, and real-world application of One Health concepts.

BEACON advances beyond conventional, passive learning by implementing AI-driven learning systems that tailor educational experiences to each student's unique needs and pace. This personalization ensures a deeper comprehension of One Health principles. Through state of the art technologies as augmented reality (AR) and virtual reality (VR), students will participate in immersive simulations, allowing them to visualize and interact with real-world health challenges, such as zoonotic disease outbreaks or the environmental impacts of climate change. This experiential learning not only enhances engagement but also fosters a more meaningful connection to global health issues.

BEACON's approach ensures these technologies are scalable and adaptable to diverse technological infrastructures and cultural contexts, allowing widespread application across different regions. Regular updates and localized content will make the tools relevant and impactful for students regardless of their geographic location or technological resources. While many One Health initiatives focus on local or national issues, BEACON goes further by fostering global collaboration among students. AI-driven platforms will enable students from diverse geographic backgrounds to engage in virtual exchanges and collaborative problem-solving on pressing global health issues. This cross-border cooperation fosters not only interdisciplinary learning but also the development of empathy, cultural awareness, and a sense of global citizenship.

By bringing students together to work on real-world challenges, BEACON ensures that young learners gain hands-on experience in addressing health problems from a global perspective. This emphasis on collaborative problem-solving empowers students to become proactive global citizens equipped to navigate the interconnected challenges of health, environment, and society.

BEACON moves beyond theoretical knowledge by emphasizing practical applications of One Health concepts. Students will engage in real-world case studies and hands-on activities, such as simulating disease outbreaks or analyzing the effects of climate change on biodiversity. They will also participate in virtual internships and collaborate with health professionals, gaining essential problem-solving skills and cultural sensitivity. This hands-on, action-based approach ensures that students are not merely passive learners but active participants in addressing current global health challenges. This practical, experiential learning prepares them for future careers in health, environmental science, and related fields, equipping them to drive meaningful change, implementing cutting edge learning paradigms.

BEACON places a strong emphasis on inclusivity, working to bridge the digital divide by ensuring that all middle school students, particularly those from underserved regions, have access to adaptive technologies. Unlike other initiatives that often favor students with better access to technology, BEACON aims to ensure equity by providing real access to digital tools and learning platforms, regardless of a student's socioeconomic or geographic background. Educator training programs will also support teachers in effectively utilizing these technologies, ensuring a broader, more equitable impact. BEACON also pioneers the ethical use of AI in education by establishing clear guidelines to protect student privacy and ensure that AI tools are used in alignment with educational values. By preventing risks such as algorithmic bias and ensuring AI-driven systems promote collaboration over competition, BEACON sets a new standard for responsible and equitable use of technology in the classroom. By actively monitoring the implementation of AI tools, BEACON aims to prevent negative impacts, such as exacerbating educational inequalities or fostering competitive environments at the expense of collaboration. This commitment to ethical AI practices sets BEACON apart from other initiatives, reinforcing the importance of responsibility and equity in technological advancements.

1.2.2. OBJECTIVES

1.2.2.1. Research Coordination Objectives

The BEACON action is designed to advance knowledge and innovation in One Health education through strategic research coordination. The following objectives will ensure effective collaboration, knowledge sharing, and the development of cutting-edge educational technologies:

- **Establishing Research Priorities:** BEACON will define key research priorities focused on integrating AI-powered tools and immersive technologies into middle school One Health curricula.
- **Facilitating Interdisciplinary Collaboration:** BEACON will promote collaboration among experts from fields like education technology, public health, veterinary sciences, environmental studies, and AI ethics, ensuring a comprehensive approach to the challenges of One Health.
- **Developing a Data Sharing Framework:** a data-sharing framework will be established to enable effective use of research findings and educational tools across BEACON's partner network, promoting transparency and collaboration.
- **Standardizing AI Evaluation Methods:** BEACON will develop standardized methods to evaluate the effectiveness of AI tools in personalizing learning and improving One Health education outcomes, ensuring consistency across different contexts.
- **Ensuring Ethical Research Practices:** ethical implementation of AI will be prioritized, ensuring compliance with data privacy laws, addressing algorithmic bias, and promoting equitable access to learning tools.
- **Monitoring Research Impact:** continuous monitoring with Key Performance Indicators (KPIs) will measure the impact on student outcomes, teacher adoption, and accessibility, ensuring BEACON remains responsive to evolving needs.
- **Building Research Capacity:** BEACON will support capacity building through fellowships, workshops, and exchanges, particularly in regions with limited access to advanced educational tools, fostering long-term sustainability.

These objectives will drive innovation, enhance global collaboration, and promote interdisciplinary research, contributing to the advancement of One Health education and responsible use of AI in learning environments.

1.2.2.2. Capacity-building Objectives

The BEACON action focuses on enhancing the knowledge, skills, and infrastructure needed for effective AI-powered One Health education, ensuring sustainability, inclusivity, and long-term impact. The key capacity-building objectives are:

- **Enhancing Educators' Technological Proficiency:** BEACON will provide training for educators to integrate AI and immersive technologies (AR/VR) into classrooms, covering AI literacy, AR/VR applications, and technology management.
- **Developing Localized Curriculum Integration:** educators will receive support to align AI and One Health education with local curricula through customizable learning modules and guidance for adapting content to diverse cultural contexts, with low-tech options for underserved schools.
- **Building Student Competencies in One Health and AI:** students will develop critical thinking, problem-solving, and digital literacy while learning to use AI tools in real-world One Health applications, encouraging cross-cultural collaboration.
- **Supporting Disadvantaged Schools and Students:** BEACON will ensure equitable access by offering funding, scholarships, and offline learning tools to schools and students with limited resources.
- **Creating a Global Community of Practice:** a global community will be fostered through online workshops, mentorship programs, and a shared resource repository to facilitate continuous

knowledge exchange.

- **Fostering Leadership and Sustainability:** emerging leaders within schools will be trained to advocate for AI in One Health education, ensuring the initiative's scalability and sustainability beyond its lifecycle.
- **Supporting Research and Professional Development:** continuous professional development will be provided through Short-Term Scientific Missions (STSMs), workshops, and research fellowships, supporting expertise in One Health education and AI.
- **Monitoring and Assessing Capacity-building Impact;** a monitoring framework with Key Performance Indicators (KPIs) will track improvements in educator skills, student outcomes, and institutional readiness, ensuring continuous feedback and improvement.

By focusing on these objectives, BEACON will empower stakeholders to embrace innovation in One Health education, promoting sustainability, inclusivity, and equitable access to emerging technologies.

2. NETWORKING EXCELLENCE

2.1. ADDED VALUE OF NETWORKING IN S&T EXCELLENCE

2.1.1. ADDED VALUE IN RELATION TO EXISTING EFFORTS AT EUROPEAN AND/OR INTERNATIONAL LEVEL

The BEACON action leverages a pan-European network of educators, researchers, and technological experts to significantly enhance the state of One Health education. Through strategic partnerships and collaborations across Europe and beyond, BEACON contributes added value by addressing gaps in current educational efforts and advancing AI-driven solutions and immersive technologies for global health challenges.

Connecting Multidisciplinary Expertise

BEACON's strength lies in its interdisciplinary network, which integrates knowledge from fields as diverse as public health, AI, veterinary sciences, education technology, and environmental sciences. While existing European and international initiatives often focus on a single aspect of One Health, such as public health or animal welfare, BEACON connects these disciplines, offering a holistic educational approach that prepares students to understand and address the interrelated nature of human, animal, and environmental health. By doing so, BEACON builds upon existing educational efforts, such as those led by ECDC (European Centre for Disease Prevention and Control) and the WHO (World Health Organization), which primarily target higher education or adult learners. In contrast, BEACON introduces this integrative approach to middle school, filling a critical gap by equipping middle school students with both theoretical knowledge and practical skills in One Health.

Advancing AI-Powered Learning and Immersive Technologies

While some actions within Europe explore the use of AI in education, BEACON distinguishes itself by focusing on the application of AI specifically for One Health education. By integrating augmented and virtual reality (AR/VR) with AI-driven personalized learning, the action takes current educational technologies beyond existing initiatives.

International efforts, such as those in the Erasmus+ program or OECD educational actions, emphasize digital skills and global citizenship but have not yet fully embraced the potential of immersive technologies for health education at the secondary level. BEACON fills this gap by ensuring students not only acquire digital literacy but also gain immersive experiences in real-world health challenges, such as climate change, disease outbreaks, and ecosystem impacts. These experiences are designed to prepare students for the complexities of 21st-century global health challenges in ways current programs have not yet achieved.

Building Inclusive, Cross-Border Collaborations

A key value-add of BEACON is its commitment to inclusive international collaboration. By fostering

partnerships across European countries and with non-European partners, BEACON builds a network that ensures the participation of geographically and economically diverse schools. Existing One Health

networks often exclude disadvantaged schools due to resource constraints or lack of technological infrastructure. BEACON, however, will implement specific mechanisms to ensure access to low-tech alternatives and support funding for under-resourced schools.

This inclusive networking approach aligns with the goals of EU Horizon Europe and COST actions by promoting broad participation and ensuring that advances in educational technologies reach underserved populations. BEACON also contributes to the European Education Area and the Digital Education Action Plan, which prioritize inclusion, equity, and the innovative use of digital technologies in education.

Enhancing Global Competitiveness and Research Excellence

By coordinating a diverse network of experts across disciplines and regions, BEACON fosters innovation that enhances the global competitiveness of Europe's education sector. The collaborative nature of the action encourages knowledge exchange through short-term scientific missions (STSMs), joint research initiatives, and in-person workshops. These activities not only build local expertise but also contribute to the global research landscape on educational technologies and One Health, positioning Europe as a leader in AI-driven health education.

The action also seeks to extend its impact beyond European borders, collaborating with international partners to promote knowledge sharing and best practices. This global dimension ensures that the advances made within the BEACON action contribute to both European and international efforts in health and education, enhancing global preparedness for health challenges through well-educated, globally aware citizens.

Long-Term Sustainability and Capacity Building

BEACON's networking efforts emphasize the creation of sustainable partnerships that extend beyond the action's four-year duration. By engaging with international organizations, educational institutions, and policy-makers, BEACON ensures that the tools, curricula, and methodologies developed are embedded within institutional frameworks and educational systems across Europe.

Furthermore, BEACON's emphasis on capacity building ensures that both educators and students are equipped with the skills needed to adapt to future technological advancements. The action will foster a community of practice, where teachers, researchers, and policymakers can continue collaborating, sharing resources, and refining their approaches even after the formal action ends. This commitment to sustainability and long-term capacity building is essential for ensuring the lasting impact of the initiative and further advancing One Health education on a global scale.

Through these contributions, BEACON not only advances science and technology excellence but also enhances Europe's role as a global leader in AI-driven educational innovation for One Health.

2.2. ADDED VALUE OF NETWORKING IN IMPACT

2.2.1. SECURING THE CRITICAL MASS, EXPERTISE AND GEOGRAPHICAL BALANCE WITHIN THE COST MEMBERS AND BEYOND

The BEACON action brings together a diverse, pan-European network of researchers, educators, technologists, and policymakers to achieve critical mass and ensure geographical balance within the COST network. The initiative focuses on multidisciplinary collaboration, regional inclusivity, and global partnerships to maximize its impact and sustainability.

- Critical Mass of Expertise: BEACON integrates experts in One Health, AI-driven education, AR/VR, and public health, creating a strong, multisectoral network. Collaboration spans fields

like health sciences, AI, and education technology, with partnerships from leading research institutions and active engagement of educators and policymakers to ensure practical implementation in schools.

- **Geographical Balance:** BEACON emphasizes geographical diversity by including participants from across Europe, particularly low-resource regions. Outreach efforts will target

underrepresented areas, offering financial support and appointing regional liaison officers to foster local collaboration and tailor solutions to regional contexts.

- **International Collaboration Beyond COST:** BEACON extends its reach globally by partnering with non-European countries, global health organizations like WHO, and research centers. This enriches the initiative through knowledge exchange and ensures solutions are scalable and adaptable to diverse international settings, including low- and middle-income countries.
- **Recruitment and Retention of Experts:** targeted invitations, scientific missions, and international visibility through publications and presentations in relevant, key events, will attract and retain top experts across disciplines. BEACON will focus on sustained engagement by providing valuable collaboration opportunities and recognition.
- **Monitoring and Evaluation:** a monitoring framework will track participation rates, geographical balance, and feedback to maintain a strong, multidisciplinary network. This ensures the action remains adaptable, inclusive, and relevant across various educational contexts.

Through critical mass, geographical balance, and global collaboration, BEACON will create a dynamic, inclusive network that advances One Health education using AI-driven technologies while promoting sustainability and equity.

2.2.2. INVOLVEMENT OF STAKEHOLDERS

The BEACON action emphasizes the active involvement of a wide range of stakeholders to ensure its success and sustainability. Engaging educators, students, parents' associations, researchers, businesses, policymakers, non-profits, and community members will help address real needs and foster collaboration, ensuring a shared vision for One Health education.

To achieve this, BEACON will map and involve key stakeholders from diverse sectors, including secondary school educators who will implement the curriculum, students who are the primary beneficiaries, and parents' associations that provide community insights. Businesses, particularly those working in health, AI, and education technology, will be engaged to support the development of practical tools and service-learning opportunities. Non-profits and community organizations will help bridge the gap between education and local health initiatives, while policymakers and government officials will influence the integration of the curriculum into educational policies.

To promote meaningful participation, BEACON will develop an engagement plan that facilitates input through surveys, workshops, focus groups, and public forums, ensuring ongoing dialogue with stakeholders. Stakeholders will collaborate in the development and refinement of the One Health curriculum, ensuring it is practical, culturally relevant, and adaptable to diverse contexts. Regular feedback mechanisms will be established to monitor progress, assess stakeholder satisfaction, and continuously improve the initiative.

By engaging these diverse groups, BEACON will foster collaboration, promote awareness of One Health, and create lasting partnerships, ultimately enhancing the impact and sustainability of the action across communities and educational systems.

3. IMPACT

3.1. IMPACT TO SCIENCE, SOCIETY AND COMPETITIVENESS, AND POTENTIAL FOR INNOVATION/BREAKTHROUGHS

3.1.1. SCIENTIFIC, TECHNOLOGICAL, AND/OR SOCIOECONOMIC IMPACTS (INCLUDING POTENTIAL INNOVATIONS AND/OR BREAKTHROUGHS)

The BEACON initiative is set to revolutionize One Health education through the development of a comprehensive curriculum and a foundational toolset that can be implemented across the European Union. By leveraging AI-powered tools and immersive technologies, this initiative aims to enhance educational practices related to the interconnectedness of human, animal, and environmental health.

At the core of BEACON's approach is the creation of a cutting-edge One Health curriculum that integrates real-world case studies and practical applications. This curriculum is designed to provide students with the relevant skills and knowledge necessary to effectively tackle contemporary health challenges. By emphasizing experiential learning, BEACON prepares students to navigate the complexities of health issues in a holistic manner. This focus on hands-on, real-world applications ensures that learners not only understand theoretical concepts but also can apply them in practical situations, enhancing their problem-solving abilities.

In conjunction with the curriculum, BEACON will develop a basic toolset that supports educators and institutions in implementing these educational practices. While open-source solutions will be considered as an option, the initiative will explore a variety of approaches to create adaptable and scalable tools that can be customized to meet the diverse needs of educational contexts across the EU. This collaborative approach aims to foster innovation and enable the development of workable, breakthrough solutions that address the challenges of One Health education.

Moreover, the initiative will emphasize the importance of interdisciplinary collaboration among experts in public health, veterinary medicine, environmental science, and educational technology. By fostering such collaborations, BEACON seeks to enhance the understanding of the interconnections among these fields and promote innovative solutions to complex health challenges.

The socioeconomic impact of BEACON is also significant. By equipping students with knowledge about the interconnectedness of human, animal, and environmental health, the initiative will cultivate a generation of informed citizens prepared to address global health challenges. Additionally, partnerships between schools and local health organizations will promote community engagement and health advocacy, further enhancing local health initiatives.

In terms of potential innovations and breakthroughs, BEACON aims to produce a pioneering One Health curriculum that not only serves as a model for other educational programs but also integrates real-world case studies and practical applications of AI tools. The research conducted through BEACON may lead to valuable insights into the effective use of AI technologies in educational contexts, paving the way for further advancements in educational technology. Furthermore, BEACON's framework for collaboration among diverse stakeholders, including educators, health professionals, and policymakers, could serve as a blueprint for future initiatives aimed at addressing complex global challenges.

3.2. MEASURES TO MAXIMISE IMPACT

3.2.1. KNOWLEDGE CREATION, TRANSFER OF KNOWLEDGE AND CAREER DEVELOPMENT

The BEACON initiative aims to significantly impact One Health education by establishing structured measures that facilitate knowledge creation, promote the transfer of knowledge, and support career development. By creating effective mechanisms for knowledge exchange and professional growth, BEACON seeks to benefit both current participants and the broader educational landscape.

To foster collaborative research and knowledge creation, BEACON will encourage interdisciplinary initiatives among educators, researchers, and stakeholders. This includes joint research actions focused on innovative educational practices, AI applications, and the effectiveness of immersive technologies in teaching One Health concepts. Regular publications of findings and successful case studies will contribute to the academic discourse and enhance the visibility of BEACON's work. Additionally, the initiative will collaborate on developing new educational tools that leverage AI and immersive technologies, ensuring they are research-based and tailored to diverse learners.

A comprehensive knowledge transfer framework will be implemented to ensure effective sharing of insights and resources among stakeholders. This will involve organizing workshops and training sessions to equip educators with the necessary skills to implement the One Health curriculum and utilize AI technologies. An online repository of educational materials and best practices will serve as a central hub for collaboration, while mentorship programs will facilitate knowledge transfer and professional growth within the network.

BEACON is also committed to fostering career development for educators and students through various initiatives. Professional development programs will focus on competencies in AI, health education, and immersive learning, offering certification opportunities to enhance qualifications. Short-Term Scientific Missions (STSMs) will encourage collaboration with other institutions, providing practical experience in innovative educational practices. Additionally, partnerships with health organizations and educational institutions will create internship and job placement opportunities for students, enhancing their employability.

Engagement with external stakeholders, including industry partners, policymakers, and community organizations, will maximize the initiative's impact. Collaborative partnerships will facilitate knowledge exchange and align educational objectives with industry needs. BEACON will advocate for the integration of One Health education into national curricula and engage in public awareness campaigns to garner community support and encourage broader engagement with the initiative.

A robust monitoring and evaluation framework will assess the effectiveness of BEACON's knowledge creation, transfer, and career development activities. Feedback mechanisms will gather input from stakeholders on training programs and resources, while regular assessments will measure the impact on participants' skills and career trajectories. Sharing evaluation findings will inform best practices for future actions.

Through these comprehensive measures, BEACON will maximize its impact on knowledge creation, transfer, and career development within One Health education. By fostering collaboration, enhancing professional growth, and engaging with external stakeholders, BEACON aims to drive sustainable changes in educational practices, ultimately preparing a new generation of health-conscious citizens equipped to tackle global health challenges.

3.2.2. PLAN FOR DISSEMINATION AND/OR EXPLOITATION AND DIALOGUE WITH THE GENERAL PUBLIC OR POLICY

The BEACON initiative acknowledges the critical importance of effective dissemination and exploitation strategies to maximize its impact on One Health education and foster meaningful dialogue with the general public and policymakers. This plan outlines key activities to ensure widespread awareness, engagement, and support for the initiative's objectives.

To reach a diverse audience—including educators, students, policymakers, and the general public—BEACON will implement a comprehensive dissemination strategy. This involves utilizing various communication channels, such as social media, newsletters, webinars, and websites, to share updates, research findings, and educational resources. Engaging visual content, including infographics and videos, will simplify complex information, highlighting the significance of One Health education and AI-driven learning tools. Additionally, regular publications, including research articles and best practice guides, will contribute to the academic literature on innovative teaching methodologies.

Public awareness campaigns will be a vital component of BEACON's outreach. Community events and workshops will promote One Health concepts and showcase educational tools, providing opportunities for hands-on engagement. Collaborations with local organizations, health departments, and NGOs will enhance visibility and foster community involvement. Furthermore, BEACON will seek media engagement through press releases and interviews to raise awareness about the initiative and its goals. Dialogues with policymakers will also be prioritized to influence educational policies related to One Health. BEACON will develop concise policy briefs outlining research findings and actionable recommendations for integrating One Health education into national curricula. The initiative will actively engage with educational authorities to advocate for the inclusion of One Health principles in educational frameworks, hosting policy dialogues and roundtable discussions to foster collaboration between educators and policymakers.

To ensure the long-term sustainability of BEACON's innovations, a clear exploitation plan will be implemented. This includes the creation of open educational resources (OERs), such as curricula and teaching materials, which will be freely accessible and adaptable by educators across Europe. BEACON will explore licensing opportunities for educational tools developed during the initiative and

offer continuing education and professional development workshops to maintain the knowledge and skills gained. A robust monitoring and evaluation framework will assess the effectiveness of dissemination and engagement activities. Key performance indicators (KPIs) will measure the reach and impact of these efforts, while feedback mechanisms will solicit input from stakeholders to inform continuous improvements. Regular reporting on dissemination outcomes will enhance transparency and build trust among participants.

Through this comprehensive plan for dissemination and exploitation, BEACON aims to maximize its impact on One Health education while fostering meaningful dialogue with the public and policymakers. By promoting awareness, engaging stakeholders, and ensuring the sustainability of its innovations, BEACON seeks to create a lasting legacy in education that empowers future generations to address the complexities of health holistically.

4. IMPLEMENTATION

4.1. COHERENCE AND EFFECTIVENESS OF THE WORK PLAN

4.1.1. DESCRIPTION OF WORKING GROUPS, TASKS AND ACTIVITIES

The BEACON initiative will be executed through five working groups (WGs), each focusing on specific objectives critical for achieving its overarching goals in One Health education. This structured approach ensures that all relevant aspects are effectively addressed in a collaborative manner.

- Working Group 1: Curriculum Development and Research aims to create a comprehensive One Health curriculum that incorporates AI-driven tools and immersive technologies. Key tasks include conducting a needs assessment, developing curriculum materials, piloting the curriculum in select schools, and collaborating with One Health experts. Activities involve workshops with educators, student focus groups, and research on integrating technology into health education.
- Working Group 2: Educator Training and Capacity Building focuses on equipping educators with the skills necessary for implementing the curriculum and utilizing AI tools. This includes designing training modules, developing mentorship programs, and creating a community of practice for ongoing support. Activities consist of professional development workshops, online courses, and networking events.
- Working Group 3: Student Engagement and Challenge-Driven Actions encourages student participation in real-world health challenges through action-based learning. Tasks involve designing challenge-driven projects, facilitating cross-border collaborations, and organizing competitions. Activities include hackathons, virtual exchange programs, and public exhibitions to showcase student work.
- Working Group 4: Monitoring, Evaluation, and Impact Assessment establishes a framework to evaluate the effectiveness of BEACON's activities. This includes developing metrics, conducting regular evaluations, and preparing progress reports for continuous improvement. Activities involve surveys, focus groups, data analysis workshops, and annual reporting sessions.
- Working Group 5: Legal Aspects and Standards ensures compliance with legal and ethical standards related to AI in education. Tasks include researching relevant laws, developing ethical guidelines, and monitoring compliance. Activities encompass workshops on ethical AI use, guideline development sessions, and regular compliance reviews.

To enhance coherence across these groups, BEACON will implement coordination and communication activities, including monthly meetings among group leaders, a centralized online platform for sharing resources, and annual retreats for team building and progress reviews. This structured approach, focusing on curriculum development, educator training, student engagement, monitoring, evaluation, and legal compliance, aims to create a sustainable and impactful model for One Health education. Our ambition is for BEACON to help transform One Health education, effectively addressing global health education challenges while laying the groundwork and facilitating later relevant projects and developments in the same direction.

4.1.2. DESCRIPTION OF DELIVERABLES AND TIMEFRAME

The BEACON action is strategically designed to achieve significant advancements in One Health education over a four-year duration, structured around a series of key deliverables that each working group will produce. This cohesive approach addresses contemporary educational challenges and ensures that the objectives are met efficiently and effectively.

Deliverables by Working Group 1: Curriculum Development and Research: the action will kick off with a Needs Assessment Report by Month 6, as result of Working Group 1. This report will identify gaps in current One Health curricula, providing a solid foundation for subsequent developments. Following this assessment, the group will embark on creating comprehensive Curriculum Materials (Month 7 to Month 48), integrating advanced pedagogical methods, including AI-driven tools and immersive technologies, to enhance the learning experience. A Pilot Program Evaluation Report will span from Month 13 to Month 48, allowing for iterative feedback and continuous improvement based on real-world classroom experiences. To support educators in implementing these materials, a Resource Guide will be made available by Month 24. The culmination of this work will be the Finalized Curriculum Package, delivered by Month 36, which will incorporate insights and refinements obtained throughout the pilot testing phase.

Deliverables by Working Group 2: Educator Training and Capacity Building: this group will ensure that teachers are well-prepared to deliver the new curriculum. By Month 12, a Mentorship Program Framework will be established to foster collaboration and peer support among educators. Concurrently, Training Modules will be developed to equip teachers with essential skills and knowledge. From Month 12 onward, Professional Development Workshops and a biannual summer school will provide ongoing training opportunities, allowing educators to engage with innovative teaching practices. The effectiveness of these initiatives will be evaluated in the Mentorship Program Implementation Report, scheduled for completion between Months 36 and 48.

Deliverables by Working Group 3: Student Engagement and Challenge-Driven Actions: this group will focus on fostering student involvement through Challenge Action Designs, which will be completed by Month 8. This initiative aims to engage students with real-world health challenges, promoting critical thinking and problem-solving skills. By Month 14, a Virtual Exchange Program Framework will connect students globally, enhancing their learning experience through diverse perspectives. The group will also produce Competition and Exhibition Reports biannually from Month 12 to Month 48, showcasing student innovations and achievements. The final output will be the Final Action Outcomes Report, delivered by Month 48, summarizing the impact of these engagement strategies.

Deliverables by Working Group 4: Monitoring, Evaluation, and Impact Assessment: to ensure accountability and effectiveness, Working Group 4 will establish a Monitoring and Evaluation Framework by Month 5. This framework will set clear metrics for success, enabling the collection of reliable data. A Baseline Data Report will be completed by Month 12, establishing current practices in One Health education against which progress can be measured. Starting in Month 12, Annual Impact Assessment Reports will track advancements and outcomes, leading to a Final Evaluation Report by Month 48, summarizing the overall impact of the BEACON action.

Deliverables by Working Group 5: Legal Aspects and Standards: this group will ensure that all project activities comply with relevant legal and ethical standards. A Legal Compliance Report will be prepared by Month 4, followed by an Ethical Guidelines Document by Month 10. Ongoing compliance will be monitored through Biannual Compliance Review Reports, beginning in Month 12, to ensure adherence to established guidelines throughout the action's duration.

Combined Dissemination Efforts: a robust dissemination strategy will be developed in Month 6 to ensure that the outcomes of the BEACON action reach a wide audience. Continuous participation in pedagogy conferences and seminars will allow findings to be shared with educators, policymakers, and the public. A biannual summer school will facilitate immersive learning experiences, while regular blog posts and social media updates will engage the community and foster ongoing discussions. Specialized media interventions will target educational and policy-focused outlets, maximizing visibility and engagement. To conclude the action and amplify its impact, a final open online event will be held in Month 48. This event will disseminate the action's outcomes broadly and influence decision-makers,

stakeholders and the broader public to support and help adopt the developed curriculum, ensuring that the network's efforts continue with further resources and means of action.

The carefully structured timeline of deliverables not only allows for systematic implementation but also maximizes impact by ensuring that each phase builds upon the previous one. This strategic framework facilitates effective engagement with educators, students, and the wider community, ultimately enhancing One Health education in a meaningful and sustainable manner.

4.1.3. RISK ANALYSIS AND CONTINGENCY PLANS

The BEACON action recognizes that its four-year implementation may encounter various risks that could impede progress in enhancing One Health education. To ensure the action's success and

sustainability, it is vital to identify these risks and develop effective contingency plans. A comprehensive risk analysis has identified several key concerns, including technological challenges, resistance from educators, limited participation, funding shortfalls, data privacy issues, regulatory changes, inconsistent coordination among working groups, evaluation challenges, lack of resources for pilot projects, insufficient official support, and indifference or unwillingness to implement new approaches.

Technological challenges may arise in integrating AI tools and immersive technologies into existing educational frameworks. To address these challenges, BEACON will prioritize open-source solutions as the first line of defense. This approach promotes sustainability, enabling EU-wide and international implementation of necessary technological tools while allowing for easy adaptation to diverse educational contexts. Additionally, BEACON will provide comprehensive training and technical support for educators, ensuring they are equipped to effectively utilize these technologies. A dedicated helpdesk will also be available for real-time assistance during the implementation phase.

Resistance from educators poses another risk, as some may be hesitant to adopt new teaching methodologies, or feel threatened by new approaches and tools. To encourage acceptance, BEACON will conduct professional development workshops aimed at addressing concerns and demonstrating successful implementations from early adopters. Moreover, BEACON is committed to long-term planning beyond the action's duration. By establishing a supportive community among educators and providing ongoing resources, the initiative aims to sustain the momentum of One Health education. This comprehensive strategy will help mitigate risks and ensure the effective integration of innovative educational tools, ultimately contributing to a more sustainable approach to health education.

Limited participation from diverse backgrounds is also a potential challenge. To combat this, BEACON will enhance outreach efforts through targeted marketing campaigns that emphasize the action's benefits and opportunities. Moreover, offering incentives such as stipends for training participation may help attract and retain participants. Funding shortfalls could impact various activities, so we plan to prioritize essential tasks and explore partnerships with local organizations for resource-sharing. Additionally, we will seek alternative funding sources through grants and sponsorships.

All legitimate concerns regarding data privacy, ethical considerations, and the overall quality of deliverables associated with using AI in education will be addressed proactively by BEACON. In the event that any data privacy issues or ethical dilemmas arise, a thorough and immediate review of data management practices will be conducted, followed by necessary updates to protocols. To maintain compliance and uphold high standards, BEACON will implement regular training sessions focused on ethical guidelines. Furthermore, recognizing that regulatory changes in educational policies may require modifications to our strategies, BEACON is committed to remaining agile and responsive, adapting activities as needed while ensuring that stakeholders are kept well-informed throughout the process. This proactive approach will help to mitigate risks and foster trust in the BEACON initiative, ultimately contributing to the successful implementation of One Health education.

Lack of resources to implement pilot projects is another significant risk. To mitigate this, we will create a detailed resource allocation plan early in the project to ensure sufficient materials, personnel, and funding for effective pilot implementation. Additionally, insufficient official support from educational

institutions or governmental bodies may hinder progress. To address this, we will engage with key stakeholders from the outset to secure their commitment and support, fostering partnerships that enhance credibility and resources for the action. Indifference or unwillingness to implement new approaches can also pose challenges. To counter this, we will actively involve educators and stakeholders in the development process, demonstrating the value of innovative methodologies through pilot success stories. A strong focus on community engagement and communication will be essential to shifting mindsets and building enthusiasm around new practices.

Regular evaluations of our communication strategies will be conducted to enhance efficiency and communication within and among working groups. Finally, evaluation challenges may arise in measuring the impact of our activities. To address this, we will collaborate with evaluation experts to refine our metrics and ensure relevance through regular stakeholder feedback.

By identifying these potential risks and developing comprehensive contingency plans, the BEACON action demonstrates a commitment to proactive risk management. This strategic approach not only fosters resilience and adaptability but also positions BEACON to navigate uncertainties effectively, ensuring the successful advancement of One Health education. By addressing these concerns systematically, BEACON is poised to achieve its action goals, making a meaningful impact in the field of health education.

4.1.4. GANTT DIAGRAM

This section presents a detailed breakdown of the scheduled tasks for the BEACON action, organized by working group and deliverable. This breakdown is followed by a Gantt chart that visually represents the timeline and interdependencies of these tasks, providing a clear overview of the project's implementation schedule.

Deliverable	Timeline
Working Group 1: Curriculum Development and Research	
1a: Needs Assessment Report	Month 1 - 6
1b: Develop Curriculum Materials (ongoing)	Month 7 - 48
1c: Pilot Program Evaluation Report (ongoing)	Month 13 - 48
1d: Resource Guide for Educators	Month 19 - 24
1e: Finalized Curriculum Package	Month 25 - 48
Working Group 2: Educator Training and Capacity Building	
2a: Establish Mentorship Program Framework	Month 1 - 12
2b: Develop Training Modules	Month 1 - 12
2c: Professional Development Workshops and summer school (annual)	Month 12 - 48
2d: Mentorship Program Implementation Report	Month 36 - 48
Working Group 3: Student Engagement and Challenge-Driven Actions	
3a: Design Challenge Action Designs	Month 1 - 8

3b: Establish Virtual Exchange Program Framework	Month 9 - 14
3c: Competition and Exhibition Reports (biannual)	Month 12 - 48
3d: Final Action Outcomes Report	Month 36 - 48

Working Group 4: Monitoring, Evaluation, and Impact Assessment

4a: Create Monitoring and Evaluation Framework	Month 1 - 12
4b: Complete Baseline Data Report	Month 6 - 12

Deliverable	Timeline
4c: Annual Impact Assessment Reports (ongoing)	Month 12 - 48
4d: Final Evaluation Report	Month 36 - 48

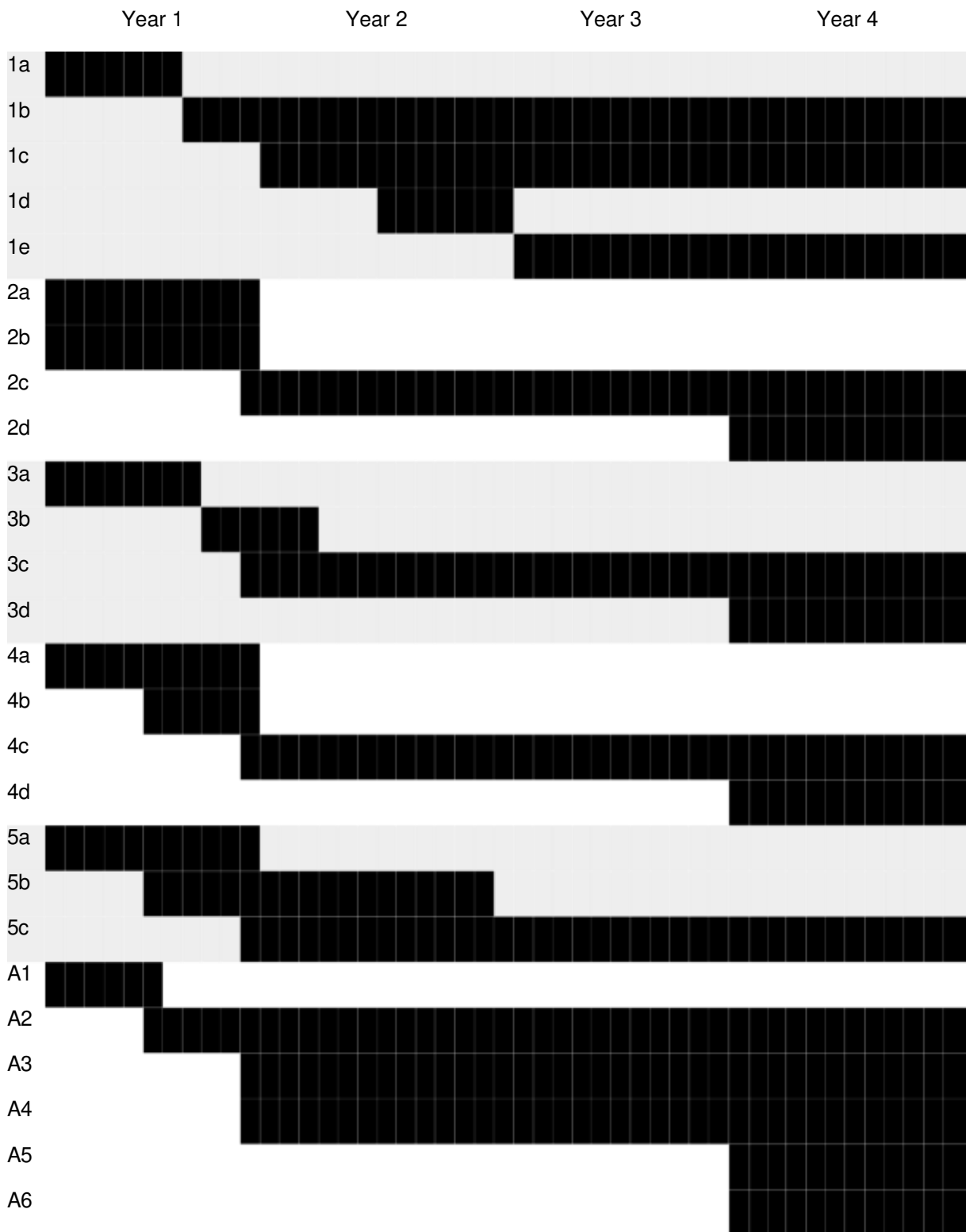
Working Group 5: Legal Aspects and Standards

5a: Develop Legal Compliance Report	Month 1 - 12
5b: Create Ethical Guidelines Document	Month 6 - 24
5c: Biannual Compliance Review Reports (ongoing)	Month 12 - 48

All Work Groups: Combined Dissemination Efforts

A1: Develop Dissemination Strategy	Month 1 - 6
A2: Continuous Participation in Conferences and Seminars	Month 6 - 48
A3: Organize Biannual Summer School	Month 12 - 48
A4: Regular Blog Posts and Social Media Updates	Month 12 - 48
A5: Final Open Online Event to Disseminate Outcomes	Month 36 - 48
A6: Publication of Final Report	Month 36 - 48

The following Gantt chart illustrates the timeline and interdependencies of the deliverables within the BEACON action. It provides a visual representation of the scheduled tasks, highlighting the key milestones for each working group and their collective efforts:



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