**EIT HEI Initiative Call for Proposals 2024**

**Application form**

**Part B**

Part B (the narrative part of the application, to be uploaded as one Word document)

Using this template, please complete Part B of the EIT HEI Initiative Call for Proposals 2024 application.

In this document, you will provide the main narrative of the proposal, broken down into three overarching Sections/evaluation criteria:

1. Excellence
2. Impact
3. Quality and Efficiency of Implementation

Please follow the prompts found throughout this template in grey font to shape the contents of each section and sub-section of the application. Insert your application content for each sub-section where INSERT TEXT HEREis indicated and ensure that all prompts are removed in the final document.

Please use Times New Roman font throughout the document, with a minimum font size of 11 points. Standard character spacing and a minimum of single line spacing is to be used. This applies to the body text, including text in tables. The Part B document should not exceed 33 pages.

**Proposals must address all requirements listed in the prompts, and they will be evaluated accordingly.**

**Application Content: Please answer all questions**

Section 1: EXCELLENCE (maximum 10 pages)

**SMART**

**S**cientific **M**ethodologies for **A**dvanced **R**esearch in **T**eaching

**1.1 Vision and Objectives (maximum 2 pages/6,000 characters)**

By 2030, our consortium envisions a **transformation in science education within universities across Europe**, **replacing traditional theoretical approaches with practical, individualized, and technology-driven learning experiences.** Central to this vision is integrating our **Dr. Vida Education device**—a multitask, compact, affordable, and eco-friendly tool—into the academic curriculum of technology and scientific degrees (<https://smartupdreducation.wixsite.com/welcome> password: SMART). The device bridges theoretical learning with practical experimentation, encompassing disciplines such as bioinformatics, chemistry, biochemistry, physics, biotechnology, engineering, and medicine. It promotes innovation and sustainability in education while leveraging **artificial intelligence (AI) and bioinformatics** tools to transform learning and research. Advanced image analysis and data-driven insights enhance hands-on education, equipping students with expertise in cutting-edge technologies. For instance, AI enables real-time analysis of experimental results, offering instant feedback and personalized learning paths. In biotechnology and medicine, bioinformatics supports complex data analysis, addressing issues like water contamination (e.g., Hg and Ar) or epidemiological studies (e.g., lactase intolerance, sexually transmitted diseases). The project aligns with the EIT HEI Initiative and European policy priorities, fostering innovation and addressing key societal challenges as follows:

* [**European Green Deal:**](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52019DC0640&utm_source=chatgpt.com)The eco-friendly design of the Dr. Vida Education device minimizes resource use and reduces the environmental footprint of science education, supporting Europe’s sustainability goals via the [**analytical minimalism concept**](https://pubs.rsc.org/en/content/articlelanding/2010/jm/JA9951000169?utm_source=chatgpt.com) achieving accurate, reliable, and actionable analytical results using the simplest, most efficient, and resource-conscious methods. It aligns with principles of sustainability, practicality, and accessibility in analytical processes, whether in science, technology, or other fields.
* [**EU Digital Education Action Plan (2021-2027):**](https://education.ec.europa.eu/focus-topics/digital-education/action-plan?utm_source=chatgpt.com) By integrating AI and bioinformatics, the device aligns with the EU’s push for the digital transformation of education.
* [**European Skills Agenda:**](https://ec.europa.eu/social/main.jsp?catId=1223&langId=en) The project addresses the agenda’s focus on reskilling and upskilling, equipping graduates with advanced competencies essential for the labor market.
* [**EU Recommendation on Key Competences for Lifelong Learning:**](https://education.ec.europa.eu/focus-topics/improving-quality/key-competences?utm_source=chatgpt.com) The initiative fosters key competences such as digital literacy, science and technology expertise, and entrepreneurial skills.

By equipping students and educators with Dr. Vida Education, supported by AI and bioinformatics capabilities, we aim to:

1. **Transform HEIs into innovation hubs**, bridging learning, research, and business through technology-driven solutions.
2. **Foster a workforce skilled in AI and data analysis**, essential for addressing global health, sustainability, and technology challenges.
3. **Position Europe as a global leader in science education innovation**, ensuring competitive advantage in the evolving digital landscape.

This vision aligns with the EIT HEI Initiative's goals of making European universities global leaders in innovative education, impactful research, and sustainability by 2030. Through the IVAPs, the project fosters a sustainable innovation ecosystem by integrating the Dr. Vida Education device into five disciplines, revolutionizing education with practical, personalized learning. Collaboration between HEIs, businesses, and research centers drives innovation and startup development, transitioning academic solutions to market. By 2030, the initiative targets adoption in 20 European and 20 global HEIs, ensuring systemic impact, while innovation boot camps enhance skills, employability, and workforce readiness.

**Communities (KICs)**:

**EIT Health**: By integrating bioinformatics tools and supporting epidemiological studies, the device contributes to advancements in medical education and research, addressing critical global health challenges.

**EIT Climate-KIC**: The device’s eco-friendly design and applications in sustainability (e.g., water contamination monitoring) align with goals to tackle climate change through innovation.

**Table A. SMART Project's IVAP: Phases, Actions, and respective SMART characteristics.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Phase** | **Action** | **S**pecific | **M**easurable | **A**chievable | **R**elevant | **T**ime bound |
| **Phase 1**  **(2025-2026)**  **Foundation and Pilot Implementation** | 1  Develop and Integrate the Device into beneficiaries´Curricula | Pilot program with beneficiaries | Up to 500 students in first phase. | Experts Consortium | Practical science education. | Integration by the end of 2025 |
| 2  Build an Innovation Network | Building “SMARTUP” an Star-up on Education | Peducation program in [conferences](https://www.bioscopegroup.org/conferences/) (up to 5 each year) | Utilize existing UNL-BIOSCOPE Conferences | collaboration between academia and industry | SMARTUP operational by the end of Phase 1 |
| **Action 2**  **Phase 2A (2026-2027)**  **Expansion and Impact Enhancement** | **3**  Scale Adoption Across Europe | Expand the program to 20 HEIs across Europe. | 2000 students and 20 educators | Secure additional national funding. | Promotes Europe-wide educational transformation. | Complete scaling by the end of 2027. |
| **4**  Foster Entrepreneurial Skills | Camps for learning | Train 160 teachers | KIC partners for mentoring and funding. | Aligns with enhancing employability. | Boot camps operational by 2026. |
| **Action 3 Phase 2B (2026-2027): Institutionalization and Global Outreach** | **5**  Institutionalize the Program | Institutionalize the Program | device into the core curricula of at least 20 HEIs. | into degree accreditation standards. | long-term systemic change in education. | Institutionalization completed by the end of 2026. |
| **6**  Strengthen Global Partnerships | program globalization | collaborations with 20 global universities. | Europe’s leadership in educational innovation as leverage. | Expands Europe’s impact on global education. | Partnerships working by the end of 2027. |

**1.2. Methodology (maximum 8 pages/24,000 characters)**

The quality of teaching programs in Europe, particularly in the sciences, is often criticized for being overly theoretical with limited emphasis on experimental and practical [**components**](https://www.iop.org/sites/default/files/2019-09/practical-work-in-science.pdf?utm_source=chatgpt.com)**.** This imbalance can hinder students' preparedness for real-world applications and reduce the effectiveness of science education. Many European science programs prioritize theoretical frameworks, mathematical models, and rote learning over hands-on experimentation, reflecting traditional pedagogical models that emphasize foundational knowledge. Experimental classes are often constrained by time, resources, or faculty availability, resulting in students spending significantly more hours in lectures compared to laboratory sessions. **Resource constraints** are a significant barrier to experiential learning. **Practical sessions** require specialized equipment, materials, and laboratory spaces, which are often limited due to **budgetary restrictions**, particularly in **public universities**. Additionally, **large class sizes** in many institutions make it challenging to provide individualized or small-group experimental opportunities. Compliance with stringent EU regulations, such as the [**REACH**](https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32006R1907&utm_source=chatgpt.com) Regulation on chemical use and safety, further restricts experimental activities, particularly in undergraduate settings.

**The extent of these challenges varies across Europe**. Northern European countries like **Finland and Sweden** are recognized for integrating experiential learning effectively into their curricula, achieving a balance between theory and practice. In contrast, universities in **Southern and Eastern Europe** often face greater resource challenges, leading to more theory-heavy programs with limited laboratory opportunities. Furthermore, research-intensive universities tend to focus more on theoretical content, whereas teaching institutions may emphasize practical skills, though this is not uniform across the [**region**](https://publications.lib.chalmers.se/records/fulltext/203607/local_203607.pdf?utm_source=chatgpt.com)**s**.

There is growing evidence highlighting the need for better integration of practical learning in European science education. **Reports such as the European Commission's *Science Education for Responsible Citizenship (2015)* stress the importance of inquiry-based and experiential learning in fostering scientific** [**literacy**](https://education.ec.europa.eu/library/science-education_en)**.** While the Bologna Process aims to harmonize higher education across Europe, its implementation varies, with some countries failing to sufficiently integrate experiential learning into their programs. UNESCO's Global Education Monitoring ([**GEM**](https://gem-report-2023.unesco.org/)) reports emphasize the value of practical and vocational skills in STEM education, while also highlighting disparities in their implementation across Europe. National-level studies in countries like **Germany and the UK** reveal that many graduates feel underprepared for laboratory-based careers due to insufficient hands-on training during their [**studies**](https://link.springer.com/article/10.1007/s00216-022-03992-x?utm_source=chatgpt.com)**.**

Recent trends and reforms indicate efforts to address these issues. **Virtual labs and simulations** are being used to complement physical experiments, particularly in resource-constrained institutions. Interdisciplinary programs such as **bioinformatics and computational biology integrate practical coding and data analysis,** offering students new experimental paradigms. Additionally, partnerships between universities and industries are providing students with internships and real-world project experiences.

To improve the situation, **science education programs must undergo curriculum redesign to emphasize a balance between theory and practice,** ensuring adequate exposure to laboratory work for all students. Governments and institutions need to invest in modernizing laboratories and expanding access to experiential learning. Faculty development programs should train educators to adopt inquiry-based and experiential teaching methods, **while student-centric models with** [**smaller**](https://www.hks.harvard.edu/sites/default/files/Academic%20Dean%27s%20Office/Guide%20to%20Small-Group%20Learning.pdf) **lab groups can foster deeper engagement.** Strengthening EU frameworks to assess and enforce the integration of practical components in science programs across member states is crucial for ensuring quality and consistency.

While some steps are being taken to address these challenges, more systemic reforms are needed to ensure that students graduate with the practical skills necessary for the modern scientific workforce. Leveraging technology, aligning with [**EU**](https://europass.europa.eu/en/europass-digital-tools/european-qualifications-framework?utm_source=chatgpt.com) and [**UNESCO**](https://uis.unesco.org/en/topic/international-standard-classification-education-isced?utm_source=chatgpt.com) educational frameworks, and fostering institutional partnerships can play a pivotal role in bridging this gap.

In addressing these challenges, our team has developed. a prototype of an **affordable yet powerful small device referred as** [**Dr. Vida Education**](https://smartupdreducation.wixsite.com/welcome)**,** which offers a transformative solution. This device, which incorporates LEDs as sources of ultraviolet and visible light, has capabilities including **UV-Vis**, **fluorescence, phosphorescence analysis**, the functionality of a compact **PCR system**, and applications in **analytical, bioanalytical, and clinical biochemistry**. Additionally, its adaptability makes it suitable for **environmental studies** (e.g., pollutant monitoring) and **clinical medicine research** (e.g., point-of-care diagnostics). Also for bioinformatics and for electrical engineering. Such a tool directly addresses gaps in hands-on scientific training by providing students with access to cutting-edge technologies at a fraction of traditional costs. Its compact design ensures that even resource-constrained institutions can offer robust experimental opportunities. Furthermore, the device aligns with recent trends in interdisciplinary education, enabling practical applications in fields like bioinformatics and computational biology. Virtual simulations and real-world data integration with the device enhance experiential learning, preparing students for careers in the modern scientific workforce. **What is more important, for the first time a once-student-one-apparatus concept can be achieved, allowing personalized learning through experimental classes.** To maximize the impact of this innovation, governments and institutions must incorporate technologies like Dr. Vida Education into redesigned curricula that balance theory with hands-on practice. Investments in affordable, portable scientific tools, faculty training in experiential teaching methods, and partnerships with industry can bridge the gap between theory and practice. Dr. Vida Education enables cost-effective hands-on training, making advanced experimental techniques accessible even to resource-constrained institutions. The device supports experiential learning across disciplines such as analytical and bioanalytical chemistry, molecular biology, and clinical diagnostics, integrating real-time data acquisition and analysis. It also promotes interdisciplinary education by enabling applications in bioinformatics and computational biology. Students gain essential skills in handling programming **(LabVIEW, MATLAB, Python), signal processing (MATLAB, Python, Octave)**, and data visualization tools **(Python, Tableau, Excel).** Beyond traditional labs, the device enhances remote and blended learning through virtual labs and simulations, supporting experiments without the need for extensive laboratory setups. Its capabilities in UV-Vis and fluorescence measurements facilitate molecular analysis, enabling users to characterize chemical compounds, biomolecules, and environmental samples. With applications in quantitative and qualitative analysis, the device is invaluable for research and industrial quality control, while integrating concepts such as detection limits, calibration, and statistical data management into education. By leveraging Dr. Vida Education alongside broader systemic reforms, European science education can equip students with practical skills essential for addressing global challenges. The device supports environmental studies by monitoring pollutants like heavy metals and organic contaminants in water, soil, and air, enabling real-time environmental monitoring for conservation and compliance. In clinical fields, its compact PCR functionality facilitates on-site diagnostics for diseases, while fluorescence-based diagnostics aid biomarker detection and therapeutic decisions. Industrial applications include quality control in pharmaceuticals, food, and cosmetics, as well as process optimization. Dr. Vida Education also advances public health by enabling disease surveillance and pathogen tracking in remote areas, fostering interdisciplinary studies through bioinformatics integration. Its affordability and portability democratize access to quality science education, particularly in under-resourced regions, promoting STEM careers and equitable access to advanced tools.

Directly shaping the **Innovation Vision Action Plan (IVAP)** for the **Dr. Vida Education Project**. By aligning the assessment results with the project’s objectives, the IVAP ensures that strategic actions address critical challenges in European science education. The self-assessment highlighted the need for stronger leadership to champion experiential learning and curricular innovation. **Existing governance structures often lack mechanisms to integrate interdisciplinary tools like Dr. Vida Education**. This finding directly supports **Objective 1: Develop and Integrate the Device into Curricula**, emphasizing leadership commitment to embedding Dr. Vida Education in STEM programs to prioritize hands-on learning. Enhanced governance frameworks also reinforce **Objective 2: Build an Innovation Network**, facilitating collaboration across universities, research institutions, and industries.

Resource limitations, such as inadequate laboratory facilities, faculty expertise, and funding, were identified as significant barriers to integrating practical learning. These challenges are addressed through **Objective 5: Institutionalize the Program**, which emphasizes faculty training and investments in modernizing infrastructure for experiential learning. Moreover, ensuring equitable access to **Dr. Vida Education** aligns with **Objective 3: Scale Adoption Across Europe**, enabling resource-constrained institutions to benefit from this transformative tool. This is consistent with the goals of **the**[**European Skills Agenda**](https://employment-social-affairs.ec.europa.eu/policies-and-activities/skills-and-qualifications/european-skills-agenda_en)**to** reskill and upskill students and prepare them for future labor market demands.

The assessment further revealed that traditional curricula often lack entrepreneurial skill-building opportunities and focus excessively on theoretical knowledge. This gap is addressed through **Objective 4: Foster Entrepreneurial Skills**, which incorporates innovation boot camps and problem-solving exercises using Dr. Vida Education. These programs teach students to use advanced tools for data acquisition, signal processing, and visualization, equipping them with entrepreneurial and technical competencies. These efforts align with the objectives of the [**EU Digital Education Action Plan**](https://education.ec.europa.eu/focus-topics/digital-education/action-plan) **(2021-2027)** by fostering the use oftechnology to enhance learning outcomes.

Another critical insight from the self-assessment was the limited collaboration and knowledge exchange among HEIs, industries, and research centers, which hampers co-creation and innovation. This finding strengthens **Objective 2: Build an Innovation Network**, fostering partnerships that enable knowledge transfer and the transition of academic innovations into market-ready solutions. Establishing regional collaboration hubs also supports **Objective 6: Strengthen Global Partnerships**, ensuring international alignment and the global dissemination of innovative educational practices. This approach is informed by the [**EIT Knowledge Triangle Model**](https://eit.europa.eu/)that emphasizes the integration of education, research, and business.

The self-assessment underscored the insufficient integration of digital tools for remote and blended learning. To address this, virtual labs and simulations are emphasized under **Objective 1**, ensuring that **Dr. Vida Education** enhances experiential learning in both physical and virtual settings. This aligns with the [**REACH Regulation**](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32006R1907)**,** which ensures safety in the use of chemicals during experiential learning, and enables institutions to remain compliant while expanding practical opportunities for students.

Finally, the assessment revealed a lack of robust mechanisms for measuring and evaluating the impact of educational innovations. This gap is addressed through clear metrics under **Objective 3**, including adoption rates, student satisfaction, and improved learning outcomes. Feedback loops and iterative evaluations are integrated to refine the implementation and usage of Dr. Vida Education. These actions align with the principles outlined in the [**European Commission’s Science Education for Responsible Citizenship**](https://op.europa.eu/en/publication-detail/-/publication/a1d14fa0-8dbe-11e5-b8b7-01aa75ed71a1)report.

Several European-funded projects, such as [**OpenAIRE**](https://www.openaire.eu/)and [**Scientix**](https://www.scientix.eu/), serve as inspirations for this initiative. These projects promote open science, collaborative learning, and STEM education across Europe, aligning closely with the goals of the Dr. Vida Education project. Additionally, the [**Bologna Process**](https://education.ec.europa.eu/education-levels/higher-education/inclusive-and-connected-higher-education/bologna-process) provides a framework for harmonizing higher education across Europe, influencing the curriculum redesign strategies proposed in this project.

The findings of the HEInnovate self-assessment directly inform the selection of actions within the IVAP.Curriculum design focuses on embedding Dr. Vida Education into multidisciplinary courses to bridge theoretical and practical learning. Faculty development workshops equip educators with experiential teaching skills, ensuring effective integration of the device. A phased rollout plan enables the scaling of the device’s adoption across **20+4** HEIs by the end of Phase 2A. Collaboration hubs facilitate knowledge sharing and technical support, and **international** partnerships are fostered to promote global collaboration.

In conclusion, the **HEInnovate self-assessment** has been instrumental in identifying institutional needs and opportunities, shaping the IVAP to deliver targeted and impactful actions. By addressing challenges in leadership, resources, entrepreneurial learning, and collaboration, the **SMART** project ensures systemic reforms that bridge the gap between theoretical knowledge and practical skills. These efforts prepare students to excel in the modern workforce, making a lasting impact on European science education.

The integration of expertise and methods from different disciplines is central to achieving the objectives outlined in this project. This is reflected in Table B. Each type of student attending any of these degrees (Bio)informatics, (Bio)Chemistry, Environment, Pharmacy, and Medicine will bring unique skills and perspectives that will be harmonized to foster interdisciplinary collaboration and innovation. As depicted in Table C. In this project, students will apply their unique acquired expertise with **Dr. Vida Education** and actively teach and learn from one another, fostering a collaborative and interdisciplinary approach. This knowledge exchange ensures a deeper understanding of complex challenges and promotes holistic problem-solving. All the Universities involved in this project have the chosen degrees to implement the concept of Dr. Vida Education. The respective beneficiaries coordinators´ skills span all these disciplines, namely **Biochemical Medicine and Environmental Biochemistry**  (UNL), **Bioinformatics and ethical/explainable use of AI** (YAGHMA), **Pharmacy and Biotechnology** (UNIBO), **Biotechnology** (STAB), **Systems medicine and Biophysics** (HUJI), **medicinal Biochemistry** (BRFFA) and **business management** (Yagma, and STAB).

During Phase A, Dr. Vida Education will integrate multidisciplinary teams of students to perform case studies (Table D):

* **Protein Analysis in Urine:** Biochemistry students prepare calibration curves, medical students discuss clinical implications (e.g., kidney disease), and bioinformatics students automate data processing using Python.
* **Environmental Impact of Pharmaceuticals:** Environmental students analyze water pollutants, pharmacy students assess chemical stability, and bioinformatics students model pollutant dispersion with AI for policymaking.
* **PCR Diagnostics for Public Health:** Medical students demonstrate PCR diagnostics (e.g., lactose intolerance), biochemistry students explain DNA amplification, and bioinformatics students analyze epidemiological data for trends.

This approach bridges disciplines, fostering collaboration and practical skill development.

**Table B. Doctor Education, type of student and learning outcome & skills**

|  |  |
| --- | --- |
| **Type of student** | **Learning Outcomes (LerO) and Skills (Sk)** |
| **(Bio) Informatics** | **LerO:** Deep Programming: (LabVIEW, MATLAB, Python), Signal Processing Software (MATLAB, Python, Octave), and Data Visualization Tools (Python, MATLAB, Tableau, and Excel). **Sk**:How to Interface Electronic Devices with Computers, Printers, and Mobile Devices. |
| **(Bio) Chemistry** | **LerO:** Spectrophotometry, Fluorescence, Quality Control, Preconcentration, Analytical Separations, Experimental Error, Statistics, AI, Python, Chemical Measurements, and Kinetics. **Sk**: Deep Concepts of Analytical and Bioanalytical Chemistry. Hands-On Laboratory Work. |
| **Environment** | **LerO:** Water and Wastewater Management. Analysis of Pollutants (Metals and Organics), AI, Python, and Chemical Measurements.**Sk**: Management of water and wasteawter. Hands-On Laboratory Work. |
| **Farmacy** | **LerO:** Spectrophotometry, Fluorescence, Quality Control, Preconcentration, Analytical Separations, Experimental Error, Statistics, AI, Python, Chemical Measurements, Pharmacokinetics, Drug Analysis, and PCR. **Sk**:Analysis of Drugs and Metabolites, Hands-On Laboratory Work. |
| **Medicine** | **LerO:** Epidemiology, PCR Applications, Case Studies, Statistics, AI, Python, and Chemical Measurements. **Sk**: PCR Analysis, DNA and Medicine, Statistics for Epidemiology. |

**Table C. Integration of Expertise Through Interdisciplinary Collaboration and Peer Teaching. Some examples.**

|  |  |
| --- | --- |
| **(Bio) Inform.** | **What They Can Teach**: Data acquisition, processing, and visualization techniques using tools such as Python, MATLAB, and Tableau. Advanced signal processing methods to refine and analyze experimental data generated in chemistry, pharmacy, or environmental studies.  **What They Can Learn**: From **Bio-Chemistry**: The importance of proper experimental setup, such as designing accurate calibration curves for spectrophotometric data. From **Medicine**: How processed data can be used to extract meaningful clinical insights, such as identifying patterns in epidemiological studies or biomarker analyses. |
| **(Bio) Chem** | **What They Can Teach**:How to create and validate calibration curves for quantifying analytes, such as total proteins in urine or pollutants in water. Experimental techniques for preconcentration, separations, and analytical error minimization, which can be applied in pharmacy, environmental studies, or medical diagnostics.  **What They Can Learn**:From **Medicine**: The clinical significance of chemical measurements, such as the relevance of protein concentration in diagnosing kidney disease. From **Bioinformatics**: How to automate data processing and visualize complex datasets for more efficient analysis. |
| **Environment** | **What They Can Teach**: Methods for water and wastewater analysis, including pollutant quantification (e.g., metals and organics) and the use of AI for environmental monitoring. Insights into the ecological and health impacts of pollutants, offering context for pharmaceutical and medical applications.**What They Can Learn**: From **Pharmacy**: How to analyze the environmental persistence and degradation of pharmaceutical compounds. From **Bio-Chemistry**: Techniques for detecting and quantifying pollutants using advanced analytical tools, such as fluorescence and spectrophotometry. |
| **Farmacy** | **What They Can Teach**: Pharmacokinetics and drug metabolism, helping medical students and biochemists understand how drugs are absorbed, distributed, and excreted. Techniques for analyzing metabolites and validating the accuracy of drug testing protocols.  **What They Can Learn**: From **Medicine**: The clinical context of drug efficacy and safety, and how pharmacokinetic data informs treatment decisions. From **Environment**: The impact of pharmaceutical waste on ecosystems and how to develop environmentally friendly drugs. |
| **Medicine** | **What They Can Teach**: The clinical relevance of data, such as the medical significance of protein levels in urine or the implications of pollutant exposure on public health. How to link epidemiological data with chemical measurements to draw meaningful conclusions about population health. **What They Can Learn**: From **Bioinformatics**: Techniques to handle large datasets, such as epidemiological studies, and derive actionable insights through AI and statistical modeling. From **Bio-Chemistry**: The chemical and bioanalytical foundations of diagnostic tools, such as PCR and fluorescence-based assays. |

The project integrates the Knowledge Triangle—education, research, and business—by embedding the Dr. Vida Education device into higher education curricula to equip students with practical skills aligned with EU lifelong learning priorities. Collaborations with institutions such as UNL, BRFAA, HUJI, and STAB ensure the device remains innovative and impactful across disciplines, while partnerships with industry (STABvida, EXEL, Yaghma) facilitate market readiness, business model development, and commercialization. A robust Diversity and Inclusion Action Plan prioritizes gender equality and representation. Female leaders will be recruited to address imbalances, and outreach to underrepresented groups, including students from immigrant families and less-developed regions, ensures equity in access. Designing gender-sensitive tools, such as the "Dr. Vida Education" device, ensures inclusivity in **education** and healthcare applications.Monitoring gender balance throughout the project ensures accountability and continuous improvement. This approach aligns with [**UN SDG 5 (Gender Equality)**](https://sdgs.un.org/goals/goal5) andthe [**EUGender Equality Strategy 2020-2025**](https://ec.europa.eu/info/policies/justice-and-fundamental-rights/gender-equality/gender-equality-strategy_en), reinforcing the project's sustainability and impact. The affordability and portability of the device enable access in resource-limited contexts, such as Portugal and Greece, promoting equity in science education. Gender-sensitive tools like Dr. Vida Education integrate inclusivity into education and healthcare, with gender balance monitored under SDG 5 and the EU Gender Equality Strategy. The project’s IP strategy, guided by a Consortium Agreement, defines ownership and use while ensuring open access to research outputs. A GDPR-compliant Data Management Plan supports secure, transparent data handling, with protocols for collection, sharing, and storage. This comprehensive plan ensures long-term accessibility and reproducibility, reinforcing the project’s alignment with sustainability and innovation goals.

Section 2: IMPACT (maximum 10 pages)

**2.1 Project pathways toward impact (maximum 5 pages/15,000 characters)**

### **2.1 Project Pathways Toward Impact**

The SMART project is designed to catalyze a paradigm shift in science education within Europe and globally by embedding experiential learning, innovation, and interdisciplinary collaboration into academic curricula. By leveraging the Dr. Vida Education device, this initiative addresses the critical need for bridging theoretical knowledge with hands-on practice, fostering entrepreneurship, and promoting inclusivity across diverse educational and economic contexts. The project aligns seamlessly with the EIT HEI Initiative's objectives to position European universities as leaders in innovation, while also contributing to global sustainability and healthcare challenges.

#### **Scale and Scope: Reaching Diverse Audiences and Expanding Influence**

The SMART project targets a multi-tiered audience, encompassing students, educators, research institutions, and industry stakeholders. Its reach includes:

1. **European Institutions**: During Phase A, the project engages four European HEIs, benefiting 500 students and training 50 educators in practical and interdisciplinary skills. By Phase 2A, the program scales to include 20 HEIs, encompassing 2,000 students and 200 educators, ensuring a widespread impact across diverse academic disciplines.
2. **Global Outreach**: By 2030, the device will be institutionalized in 40 HEIs worldwide, including 20 outside Europe. This ambitious expansion fosters international collaboration and positions Europe as a leader in educational innovation.
3. **Student and Educator Empowerment**: A total of 10,000+ students and 500+ educators will gain access to the device by 2030. This ensures long-term systemic reform in science education, equipping learners with essential skills in data analysis, bioinformatics, and advanced laboratory techniques.
4. **Industry Partnerships**: The inclusion of industrial collaborators (e.g., STABvida, YAGHMA) facilitates the transition of academic innovations into market-ready solutions, fostering economic growth and supporting the development of innovation ecosystems.

The reach of SMART extends beyond direct beneficiaries, influencing policy frameworks, accreditation standards, and best practices in education through dissemination hubs and international partnerships.

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#### **Significance and Impact: Transformative Benefits for Education, Research, and Society**

The significance of the SMART project is embedded in its ability to address foundational gaps in European science education and its contribution to global challenges. Its impact is measured across key dimensions:

1. **Educational Innovation**:

**Experiential Learning**: The integration of Dr. Vida Education provides a one-student-one-device approach, enabling individualized, hands-on training in biochemistry, environmental studies, bioinformatics, and clinical diagnostics. Students gain proficiency in modern techniques such as fluorescence analysis, PCR, pollutant monitoring, and AI-based data visualization.

**Interdisciplinary Collaboration**: Case studies, such as protein analysis in urine and environmental impact assessments, facilitate cross-disciplinary teamwork, where students from medicine, bioinformatics, and chemistry work collaboratively, mirroring real-world problem-solving scenarios.

1. **Entrepreneurship and Economic Growth**:

SMARTUP, the startup incubated by the project, serves as a hub for translating educational innovations into commercial solutions. This promotes entrepreneurship, fosters the creation of new companies, and enhances regional economic growth through job creation. Innovation boot camps train 160 educators and researchers by 2030, equipping them with entrepreneurial and technical skills to drive innovation within their institutions.

1. **Inclusivity and Equity**:

The affordability and portability of the Dr. Vida Education device democratize access to high-quality science education, especially in underfunded institutions in Southern and Eastern Europe. This aligns with SDG 10 (Reducing Inequalities) and ensures greater representation of underprivileged students in STEM fields. Gender-sensitive approaches, including targeted recruitment of female leaders, ensure gender equity in project participation and leadership, contributing to SDG 5 (Gender Equality).

1. **Sustainability and Global Challenges**:

The device addresses global challenges by enabling research and education in pollutant monitoring, sustainable practices, and epidemiological studies. These efforts align with EIT Climate-KIC and EIT Health strategic objectives, fostering eco-friendly education and advanced healthcare solutions.

**Evidence-Based Design: Assumptions and Quantified Outcomes**

The project's assumptions and targets are based on extensive studies and statistics:

* Baseline studies indicate a significant gap in hands-on training across HEIs, with 60% of European universities reporting limited access to experimental resources (EU Science Education Report, 2023).
* By providing affordable tools and training, the project estimates a 30% increase in student engagement and a 40% improvement in practical skill outcomes across participating HEIs.

Quantified benchmarks include:

* **500 students and 20 educators trained** by 2026.
* **2,400 students and 100 educators** engaged across 24 HEIs by 2028.
* **10,000 students trained globally** and **40 HEIs institutionalized** by 2030.

#### **Alignment with HEInnovate and EIT KIC Objectives**

#### The HEInnovate self-assessment revealed key gaps in leadership, resource allocation, and interdisciplinary integration within European HEIs. SMART directly addresses these through its IVAP by:

1. Establishing governance structures to support curricular innovation and interdisciplinary collaboration.
2. Training educators to adopt experiential teaching methods and integrating Dr. Vida Education into diverse academic programs.
3. Aligning with EIT Health by fostering diagnostic innovations (e.g., PCR-based public health tools) and EIT Climate-KIC by addressing environmental sustainability (e.g., pollutant monitoring).

#### **Delivering and Measuring Impact: KPI Targets and Implementation Strategies**

#### To ensure the project delivers tangible results, SMART sets clear Key Performance Indicators (KPIs):

1. **Educational Impact**:

Improved learning outcomes (measured through student assessments pre- and post-implementation).

Increased adoption rates (measured through signed Memoranda of Understanding with HEIs).

1. **Entrepreneurial Growth**:

Establishment of at least one operational startup (SMARTUP) by 2026.

Development of business models for commercializing Dr. Vida Education.

1. **Global Collaboration**:

Partnerships with 20 global HEIs by 2030, fostering cross-border knowledge exchange.

#### **Long-Term Vision (2030 and Beyond).**

#### By 2030, SMART envisions a fully institutionalized, sustainable educational ecosystem where:

* HEIs across Europe and globally adopt Dr. Vida Education as a standard for practical learning.
* Collaboration hubs foster innovation and continuous improvement in teaching methodologies.
* Graduates enter the workforce with skills that align with modern industry demands, enhancing Europe’s competitive edge in science and technology.

The SMART project not only addresses immediate educational gaps but also lays the foundation for systemic reforms that ensure European HEIs lead in innovation and sustainability for decades to come.

**2.2. Measures to maximize impact – Transferability, exploitation, dissemination and communication (maximum 5 pages/15,000 characters)**

**2.2.1 Transferability plan**

The SMART Project seeks to transform science education by embedding the device into academic curricula, scaling its adoption across institutions, and ensuring sustainability through interdisciplinary collaboration and tangible actions. The transferability plan below outlines specific measures for integration, scaling, and long-term sustainability to achieve systemic impact.

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| **Integration and Pilot Implementation** |
| During the initial phase (2025–2026), the Dr. Vida Education device will be piloted at four European HEIs (UNL, UB, HUJI, and BRFAA), targeting 500 students across multiple disciplines such as biochemistry, environmental studies, and medicine. Specific modules will be developed to integrate the device into practical coursework, such as protein analysis, pollutant monitoring, and PCR diagnostics. Each HEI will allocate laboratory time and resources for testing the device, supported by faculty training workshops. Faculty development sessions will equip 50 educators across the pilot HEIs with the skills to incorporate the device’s functionalities (e.g., fluorescence analysis, UV-Vis measurements) into existing laboratory curricula. |
| **Key metrics:**   * **Student Engagement:** Feedback from 500 students on the usability and educational value of the device. * **Educator Preparedness:** Pre- and post-training evaluations for participating faculty. * **Learning Outcomes:** Comparative analysis of student performance before and after the device's integration. |

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| **Scaling Adoption Across Europe** |
| Between 2027 and 2028, the project will expand the device’s adoption to 20 additional HEIs across Europe, focusing on institutions in resource-constrained regions, including Southern and Eastern Europe. |
| **Key metrics:**   * **Collaboration Hubs:** Establish regional hubs (e.g., at UNL and UB) to provide technical support, share best practices, and disseminate standardized curriculum modules**.** * **BIOSCOPE Network Utilization:** Leverage the BIOSCOPE Conference’s extensive network of over 30,000 contacts to engage new institutions. * **Targeted Outreach:** Work with national education bodies to promote the device as a low-cost solution for experiential learning, particularly in underfunded HEIs. Each participating institution will integrate the device into degree accreditation standards, ensuring its systemic incorporation into educational programs. Adoption will be tracked through signed Memoranda of Understanding (MOUs) with HEIs, committing to curricular integration and faculty training. |

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| **Institutionalization and Global Outreach** |
| By 2030, the device will be fully institutionalized in 40 HEIs, with a robust support structure for maintenance, upgrades, and educator training. A collaborative effort with industry partners (e.g., STAB and YAGHMA) will ensure the device remains cost-effective and widely accessible. |
| Key metrics:   * Accreditation Standards: Partnering with European accreditation agencies to include device usage as a benchmark for laboratory education quality. * International Partnerships: Engage 20 global universities, particularly in underdeveloped regions, to extend the project’s reach beyond Europe. A dedicated team will provide localized support for adaptation. * Innovation Boot Camps: Launch annual boot camps for 160 educators and researchers, focusing on data analysis skills (e.g., Python, MATLAB) and entrepreneurship, fostering widespread expertise. |

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| **Sustainability and Continuous Improvement** |
| To ensure the project’s sustainability, clear mechanisms for funding, impact evaluation, and continuous improvement will be established. Key performance indicators (KPIs) will measure the project’s progress, including adoption rates (number of HEIs integrating the device into their curricula), educational impact (improved scores in student evaluations and practical assessments), sustainability (reduction in equipment costs and increased accessibility in low-resource settings). |
| Key metrics:   * Funding Diversification: Secure additional support from Horizon Europe programs, national education funds, and industry sponsorships to sustain device production and distribution. * Feedback Loops: Establish biannual evaluations at each participating institution, incorporating student and educator feedback to refine device usage and curriculum design. * Open Access: Publish experimental protocols and learning materials in open-access formats, allowing for replication and adaptation by institutions worldwide. |

**2.2.2 Exploitation, dissemination and communication**

**2.2.2.1 Dissemination, exploitation and communication**

To ensure the maximum impact of the SMART project, it is crucial to effectively communicate its findings to the relevant target audiences and stakeholders. This will be achieved through a comprehensive approach centered on dissemination, exploitation, and communication. EXEL, a highly experienced SME in managing high-profile EU research projects, will lead this effort, which is coordinated under a dedicated work package (WP3). The strategy is designed to foster awareness and engagement both during and after the project’s execution. A detailed plan outlining these activities will be prepared early in the project, specifying actions to enhance the project's visibility and reach.

**2.2.1.1 Internal Communication**

The SMART consortium ensures continuous and dynamic communication through a variety of channels, facilitating the seamless exchange of information, insights, and updates. By leveraging digital tools such as **virtual meetings**, **video conferencing**, andcollaborative **online platforms**, partners can engage efficiently across diverse locations and time zones. This communication framework integrates formal elements—such as the dissemination of official progress reports and documents—with informal interactions like **team chats** and **virtual meet-ups**. This balanced approach fosters transparency and inclusivity, strengthening R&I human capital while improving collaboration across sectors.

To further promote cooperation and cross-sectoral collaboration, **SMART** organises regular **consortium meetings**, both online and in person. These meetings are critical for deep discussions, problem-solving, and ensuring alignment with the project's overall objectives. Task-specific meetings are also scheduled to drive focused progress, particularly supporting the enhancement of excellence in Widening countries.

**2.2.1.2 Dissemination strategy**

The dissemination strategy for the SMART project will be meticulously designed to ensure the effective communication of its results, discoveries, and achievements to a wide scientific audience and beyond. Aligned with the project’s goal of fostering institutional reforms, reversing brain drain, and enhancing knowledge circulation, this strategy will begin by identifying **key stakeholders** and developing **targeted approaches** to engage diverse audiences, including policymakers, industry leaders, academics, and the general public. Leveraging a mix of traditional and digital channels—such as press releases, academic publications, social media, and a dedicated **project website**—the plan aims to maximise the visibility and impact of SMART’s outcomes.

Dissemination efforts will support key outcomes, including strengthening collaboration between academic and non-academic sectors, and improving private sector access to public R&I institutions and infrastructures. Key activities include: (1) Maintaining SMART's strong presence at relevant scientific and industry **forums**, **conferences**, and **symposia**, to showcase the project’s innovations and promote excellence in Widening countries; (2) Producing and distributing **newsletters**, **brochures**, and **infographics** to effectively communicate project progress and achievements to a wide range of stakeholders; (3) Engaging with the **media** to highlight SMART’s contributions, increasing the project’s visibility across sectors and regions; and (4) Organising **workshops** and **webinars** to disseminate findings, enhance cross-sector collaboration, and promote entrepreneurial skills among participants. These comprehensive efforts aim to position **SMART** as a driving force for impactful collaborations between academic and non-academic sectors, while enhancing the employability and career prospects of R&I talents. A detailed stakeholder engagement plan (part of D5.3) will ensure that the project’s findings are communicated effectively to the right audiences. To maximise impact, the commercial potential of results will be evaluated prior to publication, and all contributions from the EC will be duly acknowledged.

Additionally, SMART’s results and tools will be presented at four major trade shows in the USA, Europe, and MENA, further strengthening the R&I base, promoting talent mobility, and improving career opportunities across both academic and non-academic sectors. Through these efforts, **SMART** aims to leave a lasting legacy of knowledge, innovation, and capacity-building.

**Table 1: Indicative list of platforms for disseminating SMART’s advancement**

|  |  |
| --- | --- |
| **International Conferences and Trade Shows** | **Scientific Journals** |
| International Caparica Conference on Science Education, 2025,2027,2029,20231 | Review of Educational Research |
| International Caparica Conference in Analytical Proteomics 2026,2028,2030,2032 |  |
| NAFSA conferences. | Educational Researcher |
| The European Conference on Education | International Journal of Educational Technology in Higher Education |
| European Association for International Education series | Studies in Science Education |
| FENESP-Brasil | Talanta |
| FETC-USA | Analytical and Bioanalytical Chemistry |

**Table 2: List of stakeholders**

|  |  |
| --- | --- |
| **Stakeholder Groups** | **Identified entities** |
| Governmental institutions | National Ministries of Education via departments for High Education. National Research Councils and Innovation Agencies. Health Ministries and Health institutions.Introducing the SMART project at the K-12 level or in regional universities. |
| Regulators | National Agencies for Accreditation and Quality Assurance: <https://www.a3es.pt/> | <https://www.aneca.es> | <https://www.nvao.net/en> | https://www.qaa.ac.uk |
| Scientific community | STEM education specialists (Science, Technology, Engineering, Mathematics). Analytical and Bioanalytical Sciences Community. Biomedical Sciences Community. |
| Innovator community | Global innovation ecosystems like the **EIT KICs** (e.g., EIT Health, EIT Raw Materials). NGOs working on education accessibility in underserved areas. |

**2.2.2.2 Communication Plan**

Through targeted and inclusive communication efforts, **SMART** seeks to highlight the tangible impact of EU-funded research and innovation on everyday life. This strategy enhances knowledge circulation, strengthens public-private collaborations, and increases awareness of the societal value of research.

The following table (Table 3) outlines a comprehensive outreach plan designed to increase R&I support capacity, foster cross-sector collaboration, and engage the public and stakeholders. A strong digital presence and active use of social media will enhance visibility, while newsletters, press releases, and outreach materials will ensure continuous communication of the project's objectives and milestones. Scientific dissemination through conferences and publications will contribute to research excellence, while workshops and events will promote knowledge exchange and collaboration, supporting the balanced circulation of talent across sectors and regions.

**Table 3: Outreach Activities**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Activity** | **Description** | **Timing** | **Lead** | **Metrics** | **Target Audience** |
| **Digital Presence** | | | | | |
| Project Website | Central Hub for SMART Updates and Resources. | From M3, ongoing | EXEL | >2000 visits/year | General public, researchers, stakeholders |
| Social Media | Engage with updates on project platforms: X, LinkedIn, and Instagram. | From M2, ongoing | EXEL | Followers: X: 1500; LinkedIn: 800; Instagram: 300 | General public, industry, policymakers, researchers |
| **Outreach Materials** | | | | | |
| Visual Identity | Designing of logo, letterhead, and presentation templates | M1 | EXEL | 5 templates | Consortium, stakeholders |
| Brochures & Leaflets | Distribution of detailed visuals about goals and benefits | M2, updated regularly | EXEL | 2 flyers, 2 roll-ups, 2 posters | Industry, policymakers, public, researchers |
| **Content Engagement** | | | | | |
| Newsletters | Distribution of electronic updates to stakeholders | Annually | EXEL | 4/year, >200 subscribers | Industry, policymakers, researchers, public |
| Press Releases | Highlighting significant milestones to the media | At major milestones | All | >5 releases | Media, general public, industry, policymakers |
| **Scientific Communication** | | | | | |
| Conferences | Sharing findings with the scientific community | After research results | All | 20 presentations | Researchers, industry experts, policymakers |
| Publications | Publishing findings in scientific journals | After research results | All | 4 publications | Researchers, academics |
| **Events** | | | | | |
| Workshops | Promoting SMART and fostering collaborations | Annually | All | 6 workshops | Researchers, industry, policymakers, public |
| Meeting | Regional Innovation Events (Regional conference) | M36 | All | 1 workshop | Regional stakeholders, researchers, policymakers |
| Closing conference | Final event to share outcomes and enhance stakeholder interactions | M46 | NKUA | 1 conference | Researchers, policymakers, industry, general public |

**2.2.2.3 Networking and Training Activities**

The SMART Networking and Training Activities focus on improving employability and career interoperability, especially in Widening countries. These activities foster cross-sector collaboration and upskill researchers, innovators, and R&I staff across academic and non-academic sectors. Structured networking events, including workshops, conferences, and matchmaking sessions, enable stakeholders from academia and industry to exchange knowledge, break sectoral barriers, and promote "brain circulation" for stronger cross-sector ties.

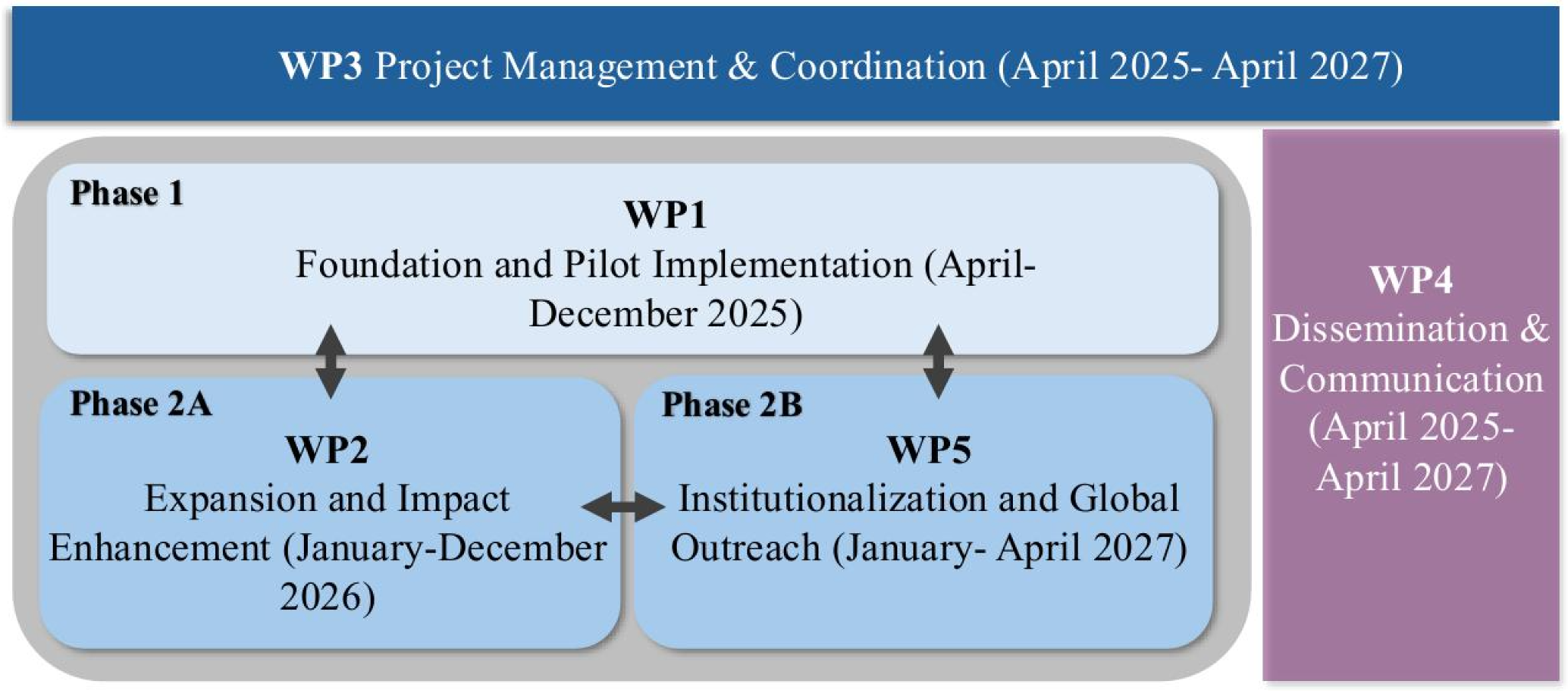
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SMART training modules will focus on entrepreneurship, equipping R&I talents with skills for diverse career paths and enhancing employability. Administrative, managerial, and technical staff will also receive training in research management, knowledge valorization, and infrastructure operation, boosting organizational capacity. The project will leverage EU research initiatives, including COST action PERMEDIK, for dissemination and recruitment, fostering synergies and expanding the application of SMART's innovative approaches.

Section 3: QUALITY AND EFFICIENCY OF IMPLEMENTATION (maximum 12 pages)

**3.1 Please provide the following (maximum 7 pages/21,000 characters)**

The work plan for the project is structured across three phases—Foundation and Pilot Implementation (2025), Expansion and Impact Enhancement (2026), and Institutionalization and Global Outreach (2027)—ensuring a progressive and scalable approach to achieving the objectives. The Gantt chart is presented below.



**SMART PERT diagram**

**Work Package 1** **(Phase 1):** **Foundation and Pilot Implementation (2025-2026)** focuses on finalizing the "Dr. Vida Education" device and integrating it into pilot curricula across beneficiary institutions, engaging 500 students.

**Task 1.1:** involves completing the device and redefining three laboratory practices aligned with the analytical minimalism concept. These practices include total protein quantification in urine, dithiocarbamate extraction and analysis in food, and PCR diagnostics for public health, ensuring a broad theoretical and interdisciplinary approach linking (Bio)informatics, (Bio)Chemistry, Environment, Pharmacy, and Medicine. Deliverables for this task include the final prototype **(D.1.1.1**) and the implementation of the three lab practices **(D.1.1.2, D.1.1.3, and D.1.1.4).**

**Task 1.2:** Focuseson testing and validating these practices in practical classes, targeting 500 students across the four beneficiary institutions. Statistical analyses **(D.1.2.1)** will be conducted to evaluate student success across the projects and institutions. Techniques include descriptive statistics, ANOVA, regression models, and machine learning to identify performance patterns and predictors. This comprehensive framework will assess the device's impact on learning outcomes and provide data-driven insights to refine educational practices, ensuring the success of the pilot phase and laying the foundation for broader implementation.

**Task 1.3:** Spread the (i) Dr. Vida Education project through international workshops in conferences organized by UNL-Bioscope in Caparica-Lisbon (five different thematic [conferences](https://www.bioscopegroup.org/conferences/) yearly). **(D.1.3.1)**

**Task 1.4:** Establishing the startup SMARTUP with the Dr. Vida Education device marks a transformative step in modernizing education. Deliverable **D.1.4.1** focuses on creating an innovative, scalable, and adaptable tool to integrate personalized learning, student engagement, and digital solutions across diverse educational levels. A hired PhD will lead R&D, evaluate the device's effectiveness, and ensure alignment with evidence-based educational practices. Their work includes data-driven refinement, curriculum integration, intellectual property development, and global networking to position SMARTUP as a leader in edtech. Post-2030, the PhD and beneficiaries will drive international expansion, leveraging the Europe-Mercosur treaty.

**Workpackage 2 (Phase 2A): Expansion and Impact Enhancement (2026-2027)**

The second phase scales the adoption of Dr. Vida Education approach to 20 HEIs, targeting 2,000 students and 20 educators. Each beneficiary will engage in the project five national HEIs collaborators, targeting a minimum of 1 teacher and 100 students per HEI (a total of 2400 students, HEIs beneficiaries + collaborators)

Key activities include:

**Task 2.1:** Engaging a total of 20 HEIs and a total of 20 educators. These educators will be trained in the laboratories of their respective national beneficiaries. (**D.2.1)**

**Task 2.2:** Launching innovation boot camps aims to train 160 educators across Europe from 2027 to 2030, with four boot camps annually (16 total, three days each, 10 participants minimum per camp). These immersive programs equip teachers with skills to integrate the Dr. Vida Education device and modern teaching methodologies, enhancing student engagement and personalized learning. The curriculum covers innovative pedagogy, technology adoption, and practical applications, fostering a network of educators as ambassadors for Dr. Vida Education. ensures scalability and sustainability by embedding these tools into everyday teaching, bridging traditional and modern education for lasting impact. (**D2.2.1)**

**Task 2.3:** Development of web-based tools in the **SMARTUPDrVIDAEDUCATION** web page so the practices developed in work package one and the statistics results are available to the educational

**Work Package 3: Dissemination, outreach and exploitation**

**Task 3.1:** **Dissemination plan to reach the scientific community and identified stakeholders.** focuses on a comprehensive dissemination plan to effectively reach the scientific community and other stakeholders. The plan begins by identifying target audiences, including researchers, civil society, and policymakers, and engaging them through discussions, focus groups, and joint projects with industry leaders and international partners to align research with practical needs and policy goals. Messages will be tailored for each audience: for the scientific community, the emphasis will be on the novelty, methodology, and implications of SMART's findings, providing detailed frameworks, datasets, and results; for policymakers, the focus will be on simplifying complex concepts into actionable insights and highlighting the societal and policy relevance of the research. To enhance visibility, SMART will organize and participate in national and international conferences, fostering collaboration and networking opportunities. Dissemination efforts will leverage multiple channels, including publishing in open-access journals, sharing findings on platforms like ResearchGate, and organizing panels to bridge science and policy. The SMART website will serve as a hub for resources and progress updates, complemented by an active presence on LinkedIn, X, and YouTube to engage the broader community. Newsletters will provide regular updates on research findings and events.A critical component of the plan is promoting continuous feedback and interaction by establishing two-way communication channels with stakeholders and international partners to support collaboration and capacity building. Deliverables include the creation and maintenance of the SMART website and social media platforms **(D3.1).** This structured approach ensures the effective dissemination of SMART’s outcomes and fosters meaningful engagement across all relevant sectors.

**Task 3.2: Communication strategy.** The communication activities of the SMART project will be ongoing throughout its duration aiming at engaging the citizens. It will include the following elements: **(1) Communication Plan**: Develop a comprehensive plan outlining milestones, deliverables, and events, utilising channels like email newsletters, the project website, and social media for targeted outreach; **(2) Mailing Lists**:Add a subscription tool to the website, allowing stakeholders to sign up for newsletters and public updates, ensuring continuous engagement; **(3) Visual Communication**: Use infographics, charts, and diagrams to present complex information in a clear, accessible way for various audiences; **(4) Engaging Communication Material**: Create a presentation video; Release press announcements and newsletters; Develop fact sheets, a project brochure, and a patient-focused brochure on screening, treatment, and advocacy; **(5) Feedback and Review**: Regularly assess the effectiveness of communication efforts and adjust based on stakeholder input; **(6) Cross-Sector Collaboration:** Promote interdisciplinary cooperation to ensure that project outputs align with policy and industry needs. **(D3.1)**

**Task 3.3: Exploitation plan.** At the start of the project, a Data Management Plan (DMP) will be established to ensure efficient utilisation and long-term sustainability. In the initial phases, an internal innovation survey will be conducted using structured questionnaires to clearly identify exploitable outcomes and assess their Technology Readiness Level (TRL). Additionally, a Total Available Market (TAM) analysis of SMART’ application fields will be conducted. Throughout the project's duration, ongoing monitoring of new funding opportunities for all partners will be undertaken. **(D3.2. D3.3)**

**Work Package 4: Project and IPR Management (Whole duration of the project)**

This work package ensures efficient project coordination, IPR management, and integration of gender equality.

**Task 4.1:** ensures day-to-day management and integrates gender equality into the project. Key actions include defining detailed work plans, monitoring performance, ensuring timely reporting, managing finances, and fostering inclusive participation through gender impact assessments and diversity policies. (**D.4.1**, **D.4.2)**.

**Task 4.2:** focuses on organizing and following up on project meetings, including setting objectives, preparing detailed agendas, managing logistics, drafting minutes, and maintaining a centralized archive. **(D.4.1).**

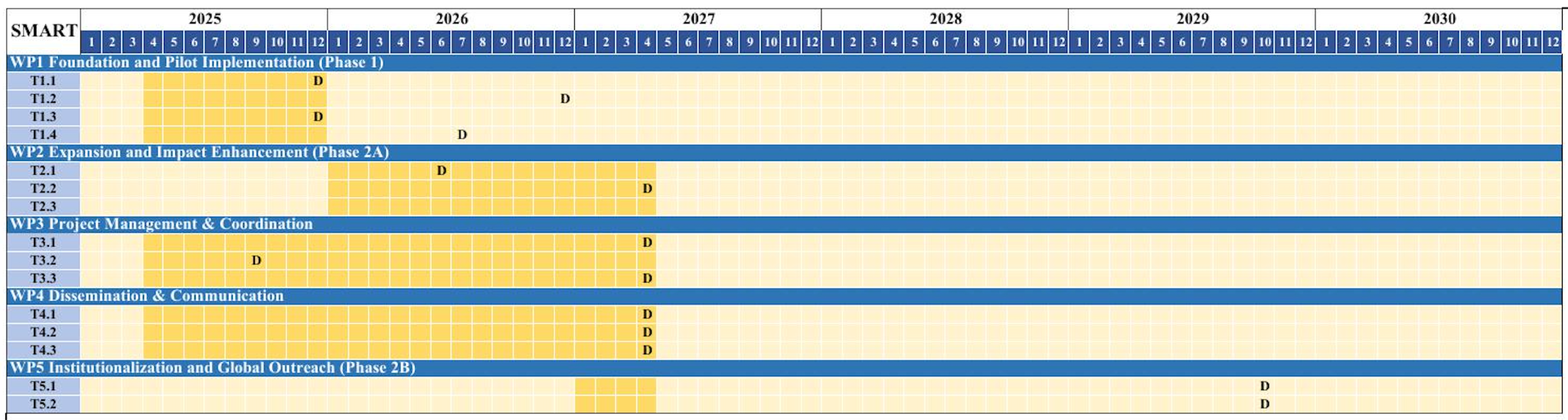
**Task 4.3:** addresses IPR management through a Consortium Agreement, establishing rules for IP ownership and confidentiality. This ensures all partners align on IP policies before the project begins. **(D.3.3).**

**Workpackage 5 (Phase 2B): Institutionalization and Global Outreach (2028-2029)**

The final phase institutionalizes the Dr. Vida Education program across 20 HEIs globally and establishes partnerships to promote its worldwide adoption.

**Task 5.1:** focuses on embedding the device into core curricula and aligning it with degree accreditation standards, ensuring its sustainability and institutional integration. Deliverables include curriculum integration plans, implementation statistics, accreditation documentation, training resources, and pilot results, all of which will be publicly available on the project webpage to enhance transparency and engagement. **(D.3.1.1)**

**Task 5.2:** aims to establish collaborations community, and open an online innovative repository where the participants in the boot camps can introduce new educational contributions. Open also to the educational community. **(D.2.3.1)**



**SMART Gantt chart**

Table D: Dr. Vida Education Student Works. Hand -on | Learning | Interdisciplinary learning | Scalability

|  |
| --- |
| **Total Protein Quantification in Urine.** Students will develop **hands-on** expertise in protein quantification techniques, including colorimetric assays (e.g., Bradford method) and spectrophotometry, with a focus on sample preparation, assay optimization, and ensuring accuracy and reproducibility. They will gain experience in modern laboratory instruments, integrating digital tools for data analysis and interpretation, and using **Python programming for data visualization and AI-driven insights.** Skills include calculating protein concentrations, constructing calibration curves, and performing statistical validation to ensure precision and reliability.Interdisciplinary learning will link urinary protein levels to clinical conditions such as **CKD, diabetes, and hypertension,** while also addressing environmental and toxicological implications of protein biomarkers. **At the Master’s level,** the project will scale to advanced proteomic techniques, utilizing high-resolution mass spectrometry for detailed protein profiling and integrating protein quantification with metabolomics for systems-level insights. High-throughput adaptations will support large-scale epidemiological studies and point-of-care diagnostic tool development, equipping students with skills to advance clinical diagnostics, biomedical research, and public health. |
| **Extraction of Dithiocarbamates in Food Samples.** Students will develop **hands-on** expertise in solid-liquid phase microextraction techniques and cloud point extraction for analyte preconcentration. They will learn to integrate digital imaging into analytical workflows, optimizing parameters for reproducibility and precision with small sample volumes. Skills include **quantitative analysis** (concentration calculations, LOD/LOQ, calibration curves) and statistical validation for reliable results.Programming and data visualization using Python, along with AI techniques, will enhance imaging result interpretation. Technology integration emphasizes using mobile devices and Dr. Vida Education for portable, accessible solutions, as well as automating experimental setups for real-time data acquisition.Interdisciplinary learning will cover the toxicological impacts of dithiocarbamates on food safety, public health, and environmental systems. **At the Master’s level,** the project scales to advanced techniques, including high-resolution and tandem mass spectrometry for precise identification and quantification, and explores the interaction of dithiocarbamates with biological systems through medical and environmental proteomics. This comprehensive approach prepares students for addressing food safety and environmental health challenges. |
| **PCR Diagnostics for Public Health: Lactose Intolerance.** Students will gain **hands-on** expertise in molecular biology techniques such as **PCR setup, DNA/RNA extraction,** and gel electrophoresis for product verification. They will learn to operate and optimize **PCR thermocyclers,** analyze real-time PCR data, and apply automation through programming. Skills include quantitative analysis (Ct values, LOD/LOQ), statistical validation (sensitivity, specificity), and Python-based bioinformatics for PCR data processing, enhanced by AI integration for diagnostics. The project emphasizes interdisciplinary learning, covering public health implications of PCR in disease surveillance, epidemiology, and environmental health monitoring. Students will explore high-throughput PCR for large-scale studies, multiplex PCR for co-infection detection, and advanced applications like integrating proteomics and mass spectrometry (e.g., MALDI-TOF). **Scalable diagnostic** workflows for outbreak response and portable diagnostic kits will address critical issues like antimicrobial resistance and environmental health monitoring, preparing students for impactful roles in public health diagnostics, |

**TABLE E.** Academic beneficiaries and expected future partners.

|  |
| --- |
| The comprehensive list of 40 universities includes Harvard Medical School (USA), University of Pittsburgh Medical Center (USA), University of Campinas (Brazil), University of São Paulo (Brazil), University of Pernambuco (Brazil), Federal University of Rio Grande do Norte (Brazil), Federal University of Santa Catarina (Brazil), Canterbury University (UK), King’s College (UK), University of Lincoln (UK), University of Toronto (Canada), McGill University (Canada), University of Ottawa (Canada), Shandong University (China), National and Kapodistrian University of Athens (NKUA), Agricultural University of Athens (AUA), University of Belgrade (Serbia), Institute of Radiology Republic of Serbia (IORS), Macedonian Academy of Arts and Sciences (MASA), University of Vigo (Spain), University of Barcelona (Spain), Complutense University of Madrid (Spain), Charles University (Czech Republic), University of Bucharest (Romania), Jagiellonian University (Poland), University of Zagreb (Croatia), University of Sarajevo (Bosnia and Herzegovina), University of Tirana (Albania), Technical University of Moldova (Moldova), NOVA-EL Cairo (Egypt), University of Johannesburg (South Africa), University of Cape Verde (Cape Verde), Vilnius University (Lithuania), University of Latvia (Latvia), University of Tartu (Estonia), Dalhousie University (Canada), University of Cape Town (South Africa), University of Pretoria (South Africa), University of Coimbra (Portugal), and University of Porto (Portugal). |
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Deliverables Table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Deliverable ID | Deliverable name | WP number | Reference to which Action, if applicable | Responsible partner | Delivery date (MM/YYYY) | Comment |
| D.1.1.1 | Final prototype. | 1 | 1 | STAB VIDA | 12 | 2025 |  |
| D.1.1.2 | Total protein quantification in urine via Dr. Vida Education | 1 | 1 | UNL | 12 | 2025 | Critical contribution of DeepPath and Colorimetric Analysis. |
| D.1.1.3 | Extraction of dithiocarbamates using solid-liquid phase… | 1 | 1 | UB | 12 | 2025 | Critical contribution of DeepPath and Colorimetric Analysis. |
| D.1.14 | PCR Diagnostics for Public Health via Dr. Vida Education. | 1 | 1 | HUJI | 12 | 2025 |  |
| D.1.2.1 | Statistics for Dr. Vida Education Approach conducted by the beneficiaries | 1 | 1 | Athens | 12 | 2026 |  |
| D.1.3.1 | Spread the (i) Dr. Vida Education project through international workshops | 1 | 2 | UNL | During all project |  |
| D.1.4.1 | Establishing the startup SMARTUP with the Dr. Vida Education | 1 | 2 | UNL | 07 | 2026 |  |
| D.2.1 | 20 educators trained for the Dr. Vida Education device, hands-on works and statistics. | 2 | 3 | Athens | 12 | 2025 |  |
| D.2.2.1 | 16 innovation boots camps. | 2 | 4 | HUJI | During all the project (staring 2025) |  |
| D.2.2.2 | Development of web-based tools | 2 | 4 | YAGHMA | During all the project (starting 2025) |  |
| D.3.1 | SMART website & social media | 3 | 4 | EXEL | During all the project (starting 2025) |  |
| D3.2 | FAIR Data Management Plan | 3 | 4 | UNL | During all the project (starting 2025) |  |
| D3.3 | Exploitation report | 3 | 4 | EXEL | 04 | 2027 |  |
| D4.1 | Agenda and minutes of project meetings | 4 | 4 | UNL | After every meeting |  |
| D4.2 | Gender equality report | 4 | 4 | EXEL | 04 | 2027 |  |
| D.5.1 | Dr. Vida Education integration in 20 European HUJIs | 3 | 5 | UB | 01 | 2029 |  |
| D.5.1.2 | Dr. Vida Education in 20 global universities. | 3 | 6 | HUJI | 09 |2029 |  |

Milestones Table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Milestone ID | Milestone name | WP number | Reference to which Action, if applicable | Responsible partner | Achievement date (MM/YYYY) | Comment |
| M.1.1 | Dr. Vida Education Readiness | 1 | 1 | STAB VIDA | 09/2025 | Half of the Dr. Vida Education devices must be operational |
| M.1.2 | Dr. Vida Education Practices Guidelines | 1 | 1 | UNL | 09/2025 | Deliverables D.1.1.2; D.1.1.3; D.1.1.4 must have been written and tested by the beneficiary responsible |
| M.1.3 | Testing and validating. | 1 | 1 | Athens | 11/2025 | Dr. Vida Education, Validated and tested in the first semester of 2026. |
| M.1.4 | Dr. Vida Education Divulgation | 1 | 2 | UNL | 10/2025 | Presented in at least 3 international conferences at Caparica |
| M.1.5 | SMARTUP | 1 | 2 | UNL | 2 /2026 | Startup SMARTUP legalized |
| M2.1 | EU HEIs Engagement | 2 | 3 | Athens | 09/2025 | 10 EU HEIs engaged |
| M2.2 | Boot Camps | 2 | 4 | HUJI | 01/2026 | At least 4 boot camps done |
| M2.3 | Web-based tools | 2 | 4 | YAGHMA | 09/2025 | At least 5 new applications presented by HEIs that are not beneficiaries. |
| M5.1 | Into Curricula | 3 | 5 | UB | 01/2027 | Incorporated in at least all beneficiaries curricula |
| M5.2 | Overseas HEIs | 3 | 6 | HUJI | 09/2027 | Incorporated in at least 10 overseas HEIs |

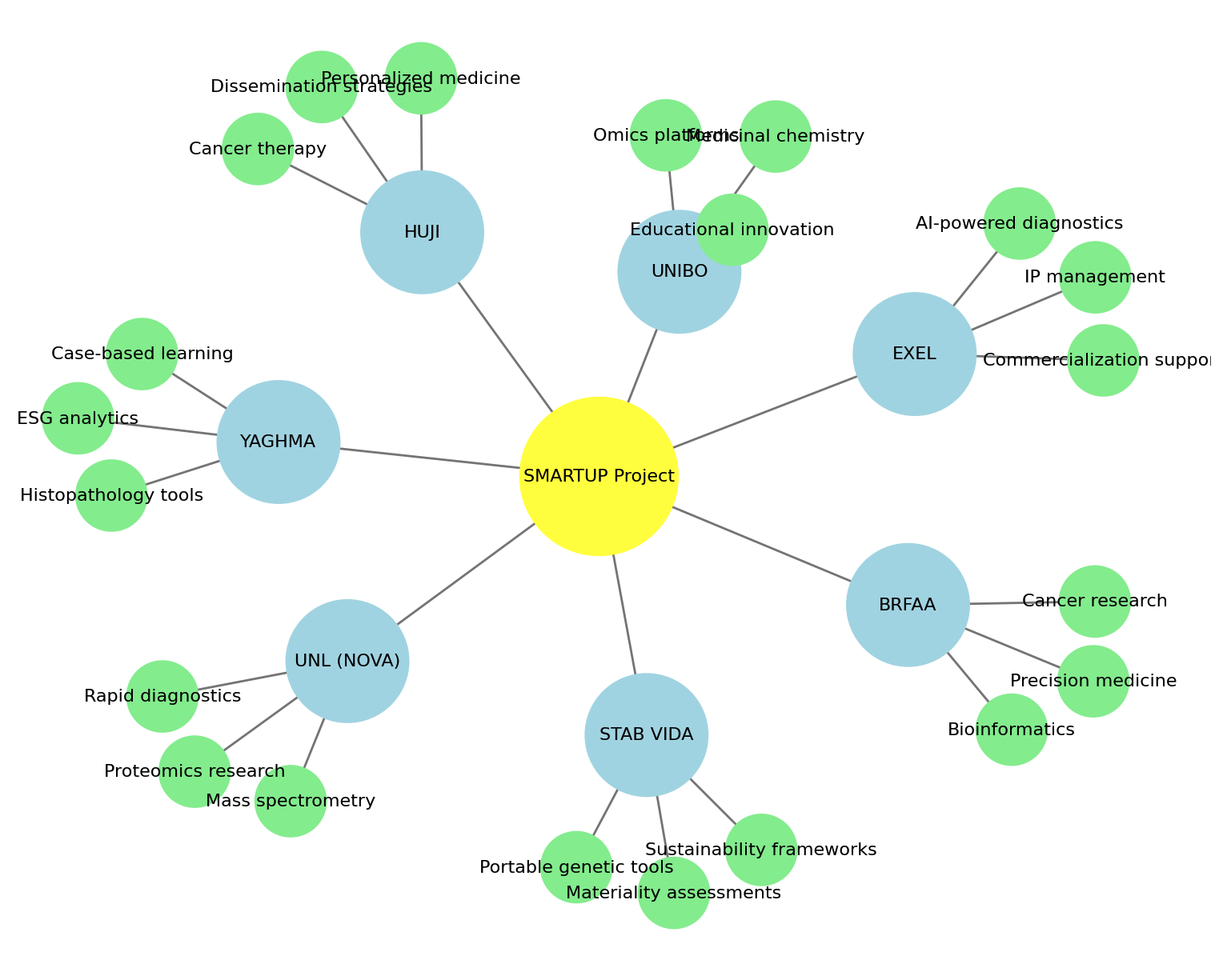
Risks Table

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| --- | --- | --- | --- | --- | --- |
| Risk ID | Description of Risk | Level of Likelihood (high, medium, low) | Level of Severity (high, medium, low) | WP number | Proposed risk mitigation measures |
| R.1 | Number of students below expectations | low | high | 1 | The beneficiaries have access to many different subjects other than the chosen ones for this work for recruitment of students |
| R.2 | Failure in creating SMARTUP | low | medium | 1 | SMARTUP tasks will be taken by The Proteomass Scientific Society, partner of the NOVA-FCT-BIOSCOPEGROUP. |
| R.3 | Partner departing consortium | low | medium | 1 | The skills necessary for this project are redundant among beneficiaries |
| R.4 | Scale Adoption across Europe fails | low | low | 2 | The number of partners linked to beneficiaries is too large across Europe to fail. Web divulgation as analternative |
| R.5 | Scale adoption outside Europe fails | low | low | 3 | The number of overseas partners linked to beneficiaries is too large across europe to fail. Web divulgation as an alternative |
| R.6 | Number of teachers below expectations | low | low | 2 | Recruitment will start a the SciEdu conference organized in 2025 by [UNL](https://sciedu2025.com/) |
| R.7 | Poor dissemination and outreach results | low | high | 3 | Clearly define the target audiences, key messages, dissemination goals, and outreach strategies at the beginning of the project. Establish Key Performance Indicators (KPIs) for dissemination efforts, such as website traffic, number of attendees at events, or citation counts. |
| R.8 | Gender imbalanced teams | low | high | 4 | Establish clear and measurable gender diversity targets for the team, aligned with EIT’s emphasis on fostering inclusivity and gender equality in research. |
| R.9 | Infringement of third-party Intellectual Property Rights | low | high | 4 | Conduct a thorough IPR Due Diligence at the project's outset, ensuring that all external IPR included in the project is identified, documented, and, if necessary, licensed appropriately. |

### **3.2 Capacity of partners and the consortium as a whole (maximum 5 pages, 15,000 characters)**

### The **SMARTUPDrEDUCATION** consortium comprises a diverse group of partners with complementary expertise, ensuring alignment with the project’s objectives and the integration of the Knowledge Triangle (education, research, and innovation). The partners bring disciplinary and interdisciplinary knowledge, resources, and networks to drive the project's success as shown in Fig. 1.

**Fig. 1 . SMARTUP PROJECT Partner abilities network of contributions.**



The consortium partners complement each other by addressing the Knowledge Triangle:

* **Education:** Partners like UNL, UNIBO, BRFAA, and HUJI contribute advanced educational programs and hands-on training in cutting-edge fields.
* **Research:** DeepPath, UNL, UNIBO, BRFAA, and HUJI drive innovation in AI, omics, and precision medicine, ensuring translational research outcomes.
* **Innovation:** STABVIDA, YAGHMA, and EXEL ensure practical application, sustainability, and commercialization of SMARTUP’s tools and methodologies.

**Consortium Partner Summaries for SMART Project with Project Contributions:**

* **YAGHMA:**  
  Specializes in ESG analytics, enhancing SMARTUP by designing metrics for societal and environmental impact. YAGHMA brings its experience from projects like *Erasmus+ Partnerships for Sustainable Enterprises* to embed sustainability into education and research through value-based innovation frameworks. YAGHMA’s contributions ensure alignment with broader sustainability goals, promoting ethical and impactful innovation.
* **STAB VIDA:**Innovates in genetic technologies, including the *Doctor Vida Pocket PCR*, a portable device for rapid diagnostics such as COVID-19 detection and lactose intolerance testing. The technology integrates practical applications into education via *Dr. Vida Education*, making genetic testing accessible and advancing healthcare and research. Internationally recognized at events like *Arab Health 2024*, STAB VIDA expands its impact through educational and research integration.
* **NOVA University of Lisbon (UNL):**  
  Renowned for expertise in proteomics and mass spectrometry, UNL contributes to SMARTUP with methodologies developed through projects like *Smart4Health* and *TaRDIS*. It offers hands-on training and interdisciplinary programs in diagnostics and therapeutics. UNL's *Bioscopegroup* fosters international collaboration, organizing over 70 international conferences and 55 courses, amplifying SMARTUP’s global visibility and impact.
* **Biomedical Research Foundation Academy of Athens (BRFAA):**  
  BRFAA provides expertise in bioinformatics, proteomics, and precision medicine through initiatives like *CORBEL* and *Summer School Biomed-AI*. These projects highlight its commitment to advancing research and education. BRFAA contributes to SMARTUP with AI integration and training programs in molecular biology, supporting interdisciplinary and innovative learning environments.
* **University of Bologna (UNIBO)**:  
  Brings expertise in omics platforms and medicinal chemistry, with experience from projects like *TOX-OER* (open resources for toxicology training) and *OEMONOM* (natural molecules research). UNIBO develops interdisciplinary educational modules and fosters innovation in neurodegenerative and metabolic disease research, bridging academia and healthcare. Its professional master’s programs, such as *Forensic Chemical Analysis* and *Applied Pharmaceutical Sciences*, serve as models for SMARTUP curricula.
* **Hebrew University of Jerusalem (HUJI):**  
  Leverages computational and biophysical approaches through the *MEDPNC* project, recognized by *Merck and Nature Research (2020)*. HUJI focuses on tumor microenvironments and personalized cancer therapy, creating interdisciplinary training modules for SMARTUP. Its contributions ensure integration of cutting-edge research with societal applications, addressing global health challenges.
* **EXEL:**  
  Provides dissemination and commercialization expertise, drawing from extensive participation in projects like *CURE*, *TO\_AITION*, *ELMUMY*, and *DECODE*. EXEL leads SMARTUP’s dissemination efforts, ensuring visibility and stakeholder engagement. It offers IP management training, fostering entrepreneurship and integrating innovation into HEI operations, while enhancing societal trust through public engagement activities.