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CASE STUDY

Safefood4eu: An interdisciplinary approach on education for sustainable agri-food systems in Europe

[version 1; peer review: 3 not approved]

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Abstract

Foods are complex products consisting of many ingredients of diverse origins. Along the food supply chains, food products are prone to spoilage and safety issues, which could give rise to different health-related concerns and outcomes. Furthermore, the existing highly centralised food systems generate substantial greenhouse gas emissions and food waste. In order to strengthen the sustainable decentralised "farm-to-fork" food chains, a mindset shift supported by relevant education and policy initiatives is highly required. The ERASMUS+ KA220 project SafeFood4EU was conceived with a crucial mission - to develop an interdisciplinary and innovative toolbox of higher education and lifelong learning courses that reflect various aspects of sustainable agri-food systems. The thematic areas discussed within the SafeFood4EU project have covered food safety and supply chain management, sustainable food systems and design, food production and quality of raw materials, food authenticity and analysis, and digital and soft skills. The main objectives have been to develop a distinctive content package and make it available to the students via an e-learning management system. The project's results, aimed at creating a pool of young and capable experts, can significantly impact future food security, thereby increasing awareness about the future challenges regarding food systems transition, dietary shift and the next generation's food security.

Plain Language Summary

The SafeFood4EU project aims to support the development of future agri-food professionals with knowledge and skills towards a more sustainable and resilient food system. The project is motivated by

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growing concerns about food safety, authenticity, and the environmental impact of globalised food supply chains. The curriculum focuses on decentralised agri-food systems, covering food safety, sustainable food supply chains, raw materials, and soft skills. The project has developed an online learning platform to deliver the curriculum and has received positive feedback from industry experts, academics, and students. The SafeFood4EU team is now exploring the possibility of developing a joint master's program in sustainable food systems. The project's key findings highlight the importance of interdisciplinary education, practical training, and soft skills development in preparing students for the challenges of the modern food system. The results bring forth the need for continued collaboration between academia and industry to ensure that upcoming agri-food professionals are equipped to support a more sustainable and resilient food system.

Keywords
sustainable agri-food systems; higher education; life-long learning, novel interdisciplinary approach, EU project, sustainability, digital learning, project results

Any reports and responses or comments on the article can be found at the end of the article.

This article is included in the Erasmus+ gateway.

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Introduction

Food systems are complex and inherit challenges from increasing consumer, government, and business pressures. They involve various complex processes and products comprised of multiple ingredients from diverse origins, so it is not surprising that their safety may be compromised. This can create the ground for adverse effects on citizens' health and add massive challenges to the survival of our regional agriculture, stimulating a need for safer and more sustainable food value chains.

A rethinking and a shift in the societal mindset is required to strengthen the development of sustainable and decentralised "farm-to-fork" food value chains and offset issues created by the industrialised food system approach. Such changes will be strongly supported by an innovative, cross-disciplinary toolbox of relevant courses, allowing higher education students and Life-Long Learners to self-create applied knowledge, which has been the core of the SafeFood4EU (Safe Food for Europe, 2021-1-BG01-KA220-HED-000027577) project idea. Although a shift in mindset towards carbon-neutral and decentralised agri-food production chains has begun, it needs to be reinforced by creating strong and relevant knowledge and developing interdisciplinary experts that can grasp various elements (from safety to sustainability) within the food system. The SafeFood4EU project addresses this, seeking to generate a pool of well-educated experts who can become part of the industries and policy-making through developing an interdisciplinary master's program. These experts will play a positive role in strengthening the demand for carbon-neutral and decentralised agri-food production chains.

SafeFood4EU in a nutshell

This growing concern about food safety is not isolated to the EU. However, it is a global trend that warrants attention, given the potential health risks associated with the complex origin of sourced ingredients. It also poses a significant challenge for our regional decentralised and traditional agriculture due to the complex design of food value chains. Some issues that need to be addressed include food authenticity, the green agri-food life cycle, and overall food quality and safety management from the farm to the fork. These challenges need to be tackled by future experts who will be trained based on the SafeFood4EU project's curriculum. By involving interdisciplinary solid theoretical underpinnings and practical examples showing the disadvantages and consequences of globalised supply chains, the project team has aimed mainly to raise awareness among a broad range of students with a diverse academic background regarding the opportunities for sustainable agri-food supply chains, regional development, and healthy life, offered by the decentralisation of agriculture and food production in the EU context, with a focus on examples from the involved countries and partner organisations.

The necessary rethinking and mindset shift to strengthen the sustainable decentralised "farm-to-fork" food value chains, respectively to shorten the food value chains (physically and socially), were to be strongly supported by an innovative transdisciplinary toolbox of relevant courses, offering students the opportunity for applied knowledge self-creation, which has been the core of the SafeFood4EU project idea. Another crucial project objective, considering the current challenging developments, has been preparing the highly needed transdisciplinary knowledge transfer platform, as close as possible in its principles and contents to practice and policy-making, considering fundamental issues such as food authenticity, fair production, food toxicology, agri-food basics, and supply chain management.

However, another objective for the project team has been rethinking consumption needs regarding regionality, quality, and the required daily amount of food, often based on subconscious perception factors and respective product quality and overall sustainability. The team pursued this objective by elaborating and testing a cutting-edge, interdisciplinary English language workshop learning format and content.

By elaboration and demonstration of the three envisaged project results:

- Professional glossary, scientific work, and collaboration guidance,
- Learning curriculum and contents,
- E-learning platform,

The project team has targeted and pursued the process and design thinking ability creation and strengthening among students, basing the envisaged systemic approach on the following formula:

A. decentralised agriculture + B. local food processing & production + C. regional distribution and consumption = D. high added value for all stakeholders + E. healthier life + F. sustainably developing regions.

Thereby, the project team has planned to deliver to the students interactively and internationally the answers to the questions WHAT (should be changed), WHY (D, E, F) and HOW (A, B, C) with regards to achieving high added local value creation and life quality increase, in the context of our sustainable agri-food systems of the future. In addition to this, the SafeFood4EU learners and teachers will become well-prepared for future collaborations and co-working on an international level in the English language by optimally utilising the professional glossary and co-working guidance contents in daily practice. In the long term perspective, the project team expects through having completed successfully the direct project goals to set the foundations for a future Joint Master's Degree Programme in the broad and highly societally relevant area of creating and managing the decentralised agri-food systems of the future, which will systematically enable learners and teachers to experience the full range of the shared knowledge platform in person and its elements.

Positioning and structure of the paper

In recent years, higher education institutions have had to adapt to potential disruptions such as wars, pandemics, natural disasters, and staff strikes, which can negatively impact

student learning[1]. Universities also strive to expand their educational offerings by incorporating distance-based learning and part-time study programs for working professionals to increase accessibility and flexibility. These developments have led to the implementation of online, blended, and distance-based programs[2]. Another notable trend is the development of multi and interdisciplinary programs, allowing students to learn from diverse European educational teams[3]. While these courses may only provide a basic understanding of specialised subjects, they offer students a broad perspective and enhance their knowledge across various domains. Despite criticism for being overly generalised, these programs offer students unique, comprehensive views and may serve as a gateway to further specialised studies. An interdisciplinary approach can offer several benefits in food systems due to its complex and interconnected nature. However, it also presents challenges, particularly in coordinating different disciplines and concerns that students may struggle with numerous related subjects without enough background information[4]. Multidisciplinary approaches have shown to be promising in food system education[5]. Such work has also been shown on multidisciplinary programmes in health care and regarding perceptions of online education in response to Covid 19[6,7]. However, there are limited reports on the design and perceptions of an interdisciplinary food systems online master's program in Europe. This paper presents an overview of an online interdisciplinary study program in sustainable and safe food systems. The three main questions which we seek to answer are below.

- What are user expert perceptions about the future expectations of online learning for European interdisciplinary food system education?
- What are the user perceptions of the disciplinary topics offered in the designed interdisciplinary food system master's program?
- What is users' perception of the future expectations of COIL-based online learning platforms?

The paper's structure is as follows: Section 2 covers the Project Background and Motivation, which describes the SafeFood4EU program, program development processes, and learning methods. Section 3 outlines the Methodology, followed by Section 4, which presents the project Results and quality feedback questionnaires. Section 5 presents the Discussion and Implications. Finally, Section 6 Concludes the paper.

Project background and motivation

The section above underscores increasing worries over food safety and sustainability, both within the EU and globally, and emphasises the need for proactive measures to protect food system stakeholders and society in the face of increasingly complex value chains. The necessary rethinking has begun to take place in practice, but still not fast enough to respond to the demand and such creation of demand will be strengthened by generating adequately educated experts, who will later on become part of the industries and policy making, and by this will positively influence the carbon neutral and decentralised agri-food value chains.

The elaboration and implementation of the European strategy for promoting protein crops is an example of a political initiative focusing on part of the challenge emphasised by SafeFood4EU. It is essential to prepare for the shift towards such proteins, as EU law defines areas around food safety and marketing, which can be highly complex[8]. The awareness of students of this initiative, as well as the Farm to Fork Strategy and other relevant strategic EU undertakings, indeed being part of the Green Deal, shall be focused in an accessible manner on the principles of sustainable local agri-food industries, so these same students would be able to implement these into the practice soon. At the same time, the food independence of many EU countries, including the project partner countries, is seriously endangered, mainly because of the current work and product pricing conditions and inconsistent relevant funding schemes. Therefore, transferring applied knowledge on food safety and smart decentralised and zero-carbon agri-food supply chain design and management to students is the only effective method to reach this goal. The local value generation and increase of principles regarding the agri-food industries are critical factors for the envisaged EU-wide agri-food industries development. Therefore, these have been professionally performed by the SafeFood4EU curriculum graduates. Moreover, the scientifically evidenced decreasing ability of learners to use professional language in writing and presenting ideas and contents, as well as to apply these in daily academic and professional contexts, has actively been addressed by the SafeFood4EU team, which has dedicated one of the three project results and its implementation to namely supporting learners in overcoming this negative trend by being trained to act in terms of communication and collaboration professionally[9,10].

Concerning the role of digitalisation, the results from 11 show that agri-food businesses are employing more digital technologies, and product-related services stand a better chance of surviving environmental challenges. The findings also add that one of the main differences between successful and unsuccessful companies is understanding the importance of digital technologies and product-related services in establishing smart and resilient production and manufacturing. Moreover, technologies and services such as spare parts and full-service contracts, along with additive manufacturing/3D printing, big data analytics, and digital twins, increased the gross annual turnover of manufacturing companies in the COVID-19 era as shown in 12, highlighting the impotance towards digital manufacturing and supply chains to support reslince. This supports the findings that companies employing some of these digital technologies and services could quickly achieve higher financial resilience, and economic sustainability, they could easily bypass impacts from supply chain distruptions such as an economic downturn, pandemics (e.g. COVID-19), political instability (the war in Ukraine), etc.[12–14]. It is also noted that companies need to achieve a higher level of

awareness and knowledge about emerging digital technologies and services among their employees, especially production managers[15].

Moreover, for the Fourth Industrial Revolution (4IR) to be successful, meaningful, and productive in the educational sector, technologies should start and end with learners - meaning that curricula should be designed to facilitate teaching and learning activities[16]. To keep pace with technological advancements, a significant shift in teaching and learning methods is necessary. This includes adapting underlying behaviors to ensure the education sector evolves alongside these innovations, especially in a global context. Given the vital role of technology in emerging jobs and employability skills, educational institutions must prioritize closing existing gaps to equip students and graduates for successful careers[17,18]. It has also been argued that investments in teaching and research development may be required, which includes the training and retraining of tutors and students to provide appropriate tools and techniques for the digital transformation[19]. Instead of investing in a new workforce, the education sector may reskill and retain the existing workforce by increasing their productivity through digital transformation.

The importance of education in providing a foundation for well-balanced societies through supporting sustainable development, technology advancements and applications, environmental responsibility, and economic performance, as discussed in 20. 20 shows that curricula of environmental engineering in higher education institutes need to be enhanced and incorporate education related to sustainable development, and at the same time developing and deploying participatory teaching and learning methods to enhance students' skills and knowledge within the discipline. This progression also encourages competencies such as critical thinking, the formulation of hypotheses for the future, systems thinking, problem-based learning, community learning, and collective decision-making[21]. In turn, these encourage a shift in formal education towards prioritising high-quality education. Moreover, university curricula should adopt a reflective approach to sustainability as a field or concept. This entails using a variety of teaching methods (e.g. interdisciplinary, diverse, and multimodal) and recognizing the importance of assessments to measure understanding and effective strategies for sustainable project implementation[20].

To enhance sustainability performance in business, there is a need to enrich current need to enrich business and sectors through improving skills and knowledge on sustainability across a variety of managerial and leadership positions, including those working in research and development[22]. 22 discuss a need for universities to provide students with well-developed sustainability skills including students who will not work as sustainability professionals, identifying four main categories, i.e. that of i) critical thinking on complex issues, ii) articulating sustainability issues, iii) understanding megatrends and global drivers, and iv) literacy on crucial sustainability issues[22]. also noted that personal engagement with sustainability issues was often low. To address this, teaching should include deeper integration into existing curricula and collaboration with real-world focused organisations (e.g. NGOs). A key take-away from the findings in this study highlight the need for further development and integration of sustainability education, aligning with 22 and their emphasis on the necessity of sustainability skills for professionals across various fields.

In regards to sustainable development in higher education, the research by 23 also points out the significance of preparing students for the future and be able to deal with challenges and opportunities of future world trends, such as the fourth industrial revolution . Students value future-oriented content and digital competencies, particularly at the Master's level, although there's a preference for interactive classroom learning over online courses. The study proposes innovative approaches like collaborative international webinars to bridge the gap between virtual and traditional learning in the context of sustainability education. It also underscores the importance of actively involving students in developing digital tools and methods to address potential skepticism. While acknowledging the benefits and challenges of digitalisation, the study stresses the need for careful planning and implementation. Crucially, the research by 23 highlights the need to clearly demonstrate the career benefits of interdisciplinary and international education in sustainable development programs to attract and retain students. Fostering strong partnerships between universities and industry can create valuable opportunities like internships, further enhancing the appeal of these programs.

Overview of articipating regions

While focused on production efficiency, globalised food supply chains must improve management and transparency. This, combined with a gap in consumer understanding of sustainable, safe, and authentic practices[24–26], has contributed to the misunderstanding of the food system. Consequently, trust in the food system has been eroded[27]. Recent incidents across the EU, fueled by complex ingredient origins, threaten public health and put strain on traditional, decentralised agriculture. To address these concerns, Bulgaria is rethinking its food system, but progress must be accelerated. The SafeFood4EU project directly supports this transformation by generating a pool of well-trained experts who will shape future industries and policies for carbon-neutral, decentralised agri-food production chains. The University of Food Technologies (UFT), with its expertise in food safety and strong government collaboration, plays a pivotal role in this process.

Similarly, Germany has shifted towards alternative food systems focused on urban regions. The University of Bonn contributes its strengths in nutritional sciences, food technology, and its unique molecular food program to enhance this trend. Initiatives like the EU's strategy for promoting protein crops and the Farm to Fork Strategy guide these developments and are brought into the classroom to empower students for practical implementation. UNIB has identified six Transdisciplinary Research Areas (TRAs) for sustainable development,

including TRA 6, "Innovation and Technology for Sustainable Futures". This TRA focuses on nutrition and health on one side and thus directly touches the present project. In addition, TRA 6 also includes research on institutional innovation, behaviour, and system transformation, for example, research that addresses behavioural changes that support sustainability, as well as research on sustainable bio-economy. Networking opportunities exist in TRA 6 through various activities, such as lecture series and topic-specific workshops. The SafeFood4EU participating Institute for Food Technology and Biotechnology of the University of Bonn in this project is a member of TRA 6.

Through Aeres University of Applied Sciences (Aeres UAS), the Netherlands leads sustainable, green knowledge and urban agriculture solutions. Students actively engage in experiential learning, applying research to address food independence challenges. Aeres supports the SafeFood4EU project by devloping courses tackling food safety, decentralised food systems and value chains, and zero-carbon goals, and also by by training future agri-food professionals who can create value within local industries. Table 1 provides an overview of the agri-food industry in each country and its challenges.

Beyond country-specific issues, several shared challenges cut across the involved regions. Addressing food safety and authenticity in the face of complex, multinational supply chains is paramount. Food fraud undermines consumer trust and jeopardises public health. Furthermore, there needs to be more consistency in funding and policy frameworks to develop robust decentralised production models. Only through collaborative knowledge-sharing and a concerted focus on sustainable practices can these cross-regional challenges be met. The SafeFood4EU project critically addresses the scientifically backed decline in learners' abilities to use professional language and apply knowledge in the food sector. To counter this, a key project result focuses on developing learners' communication and collaboration skills to ensure their effectiveness within the industry and beyond.

Project preparation, management, and key tasks

Careful preparation led by UFT preceded the SafeFood4EU project launch. Needs assessments pinpointed gaps in decentralised food system education and the importance of collaborative, problem-oriented learning. Extensive stakeholder identification was conducted alongside a foresight analysis of educational and practical demands in the field. UFT provided comprehensive management tools for activity tracking, quality assurance, risk mitigation, and financial oversight. Pre-launch and dissemination plans targeted key learner groups and relevant stakeholders, leveraging social media for outreach. Central to the project was creating a strongly interdisciplinary, practice-oriented toolkit of courses addressing decentralised, sustainable food chains, a crucial step in improving the overall food system. A long-term applicable design-thinking curriculum was developed based on UFT's food safety expertise, UNIB's strengths in food chemistry and technology, and Aeres emphasis on sustainable food systems and agri-food supply chains 4.0. The EU's Farm to Fork Strategy, a cornerstone of the EU Green Deal, was integrated into the curriculum to emphasise the transition towards a healthier, environmentally conscious food system. The project adopted the collaborative online interactive learning (COIL) model, led by Aeres, enabling collaborative online learning between diverse student groups across all partner institutions. COIL fosters intercultural awareness, digital literacy, and professional development, enhancing the student experience while providing a sustainable platform for transnational teaching that is easy to use and accessible after simple user registration. Financial management, guided by UFT's "Financial Management and Budgeting Manual," was a priority throughout the project. Regular reporting, budget tracking, and transparent communication between partners ensured responsible use of funds and adherence to project timelines. Table 2 summarises the learning course overview. That was selected for project preparation based on constructive alignment and needs assessment.

The SafeFood4EU project partners worked together on three key outcomes. UNIB led the creation of a unified glossary

Table 1. Country overview and challenges.

Country	Description	Challenges	Sources
Netherlands	The highly productive, modern, and innovative agricultural sector exports ornamental horticulture products, dairy, eggs, meat, vegetables, and fruit. It aims to be a leader in European agri-food transformation.	Challenges include high livestock concentration leading to greenhouse gas emissions and nitrogen surplus.	[28,29]
Germany	Diverse agricultural sectors ranging from specialised to family farms. Major sectors include cereals, vegetables, and horticultural products. Significant overweight population and environmental concerns persist.	Challenges include extensive monocultures, competition with the sustainable energy sector, climate change impacts, food waste, and food safety issues.	[30–33]
Bulgaria	Agriculture is significant for the economy and employment. Major products include cereals, industrial crops, honey, pig meat, and poultry. Rising temperatures and altered precipitation patterns pose risks to crop development.	Challenges include economic restructuring, climate change impacts leading to water consumption increase, and pest/disease shifts.	[34–37]

Table 2. Overview of modules and tasks.

Module	Course	Lead institution	Description
Food Safety	1. Food supply chain management	UFT	Covers management aspects of food supply chains.
	2. Introduction to Food Safety and Toxicology	UNIB	Introduces basics of food safety and toxicology.
	3. Food Authentication and Food Analysis	UNIB	Focuses on authentication techniques and food analysis methods.
Sustainable food supply chains	4. Introducing food systems	AERES	Provides an overview of food systems.
	5. Agri-food supply chains 4.0	AERES	Explores modern agri-food supply chains.
	6. Sustainable Food Systems	UFT	Emphasises sustainability in food systems.
	7. Experiencing food systems and supply chains	AERES	Provides practical experience in food systems and supply chains.
	8. Designing Sustainable Food systems	AERES	Focuses on designing sustainable food systems.
Food raw materials	9. Quality and safety of raw materials	UFT	Addresses quality and safety of raw materials used in food production.
	10. Sustainable food production	UNIB	Discusses sustainable practices in food production.
Soft skills	11. Digital tools for teaching and practice collaboration on food industries' decentralisation	Aeres	Utilises digital tools for collaborative teaching and industry decentralisation.
	12. Professional and scientific vocabulary, expression and writing	UNIB	Enhances professional and scientific communication skills in writing.

of professional terminology and presentation standards, ensuring streamlined communication across all partners. UFT led the development of a comprehensive, interdisciplinary curriculum focusing on decentralised food systems. They covered food safety, policy, and supply chain management, while UNIB delved into food chemistry, toxicology, and authenticity, and AERES emphasised design thinking for sustainable agri-food systems design. Finally, Aeres, with others, supports managed content on the learning management system (canvas). UFT established a robust quality management system for the project to ensure its effectiveness. They designed surveys for students, teachers, and employers to evaluate the impact of the project's outcomes. Success was measured by adopting SafeFood4EU courses, increased teacher and student satisfaction, and positive student experiences during internships and subsequent job placements. UFT coordinated the project, facilitating regular online meetings and in-person discussions between partners. The project team used Canvas and a Shared Drive for internal communication, and these tools also formed the foundation of the final learning platform. To gain feedback and optimise results, the partners utilised the Erasmus+ Project Results Platform to share progress and engage with external stakeholders.

Several events were strategically planned to amplify the project's reach and knowledge sharing. UFT highlighted key SafeFood4EU themes—aligned with the EU's Farm to Fork Strategy and Green Deal—during its annual scientific conference, drawing a national and European audience. UNIB organised workshops to integrate SafeFood4EU results with its ongoing sustainability research. Finally, UFT's "Business and Academia Leaders Symposium" bridged the gap between the project and industry, showcasing topics vital to food safety, security, and sustainability. Moreover, an overview of key responsibilities and expertise is shown in Table 3.

Project outcomes

The SafeFood4EU project developed a comprehensive curriculum focused on decentralised food systems. The curriculum spans four key modules – Food Safety, Sustainable Food Supply Chains, Food Raw Materials, and Soft Skills – each offering three courses combining theoretical and practical instruction. These courses were delivered collaboratively in English to students across the three partner universities. Clear communication standards were set early in the project to ensure effective learning. The SafeFood4EU curriculum is now embedded into the partner universities' educational offerings. We are also exploring an international Joint Degree Master's program with potential support from programs like ERASMUS Mundus, recognising the significant value this would offer stakeholders.

All interactive educational content was made available upon project completion, benefiting universities, training centres,

and agri-food businesses. The open-access, adaptable format of these resources fosters broad sector application. SafeFood4EU aligns with the UN's Sustainable Development Goals (SDGs), specifically Goals 2 (Zero Hunger) and 6 (Clean Water and Sanitation), through its emphasis on sustainable agriculture, improved food security, and reduced water pollution. SafeFood4EU empowers students with the knowledge to shape a more sustainable food system. They gain an in-depth understanding of global food systems, safety, and sustainable practices, preparing them for impactful careers. The collaborative exchange of expertise amongst partners has resulted in a curriculum that equips students to tackle today's challenges, leading to enhanced food quality, support for small and medium agri-food businesses, and increased innovation. SafeFood4EU strategically supports the EU's Farm to Fork and Green Deal initiatives to create a more sustainable and climate-resilient food system. The project's focus on decentralised food chains directly reduces the agricultural sector's carbon footprint. By incorporating these EU strategies into our curriculum, we educate the next generation of professionals who will drive progress toward these critical goals.

Table 4 shows the project results, including the lead organisation and the partners who participated, and a small description of each main outcome.

By deploying the content and launching the envisaged transnational interactive learning platform, the learners and teachers in all three participating countries can participate actively in the multidisciplinary learning process. In the project beginning (Project Result 1), the framework for professional language use and format in speaking and writing has been elaborated so that all involved learners, teachers, and other stakeholders can easily and understandably be part of the learning process and later part of the paradigm shift in the EU agri-food world.

Table 3. Expertise and responsibilities.

Organisation	Roles and Responsibilities	Overview of Expertise
University of Food Technologies - Plovdiv (UFT)	Leading Bulgarian institution for SafeFood, with expertise in food science, tech, and engineering Develops expertise in food safety, innovative supply chain management Actively collaborates with industry and governmental bodies	Strong focus on Food Safety and Quality Offers interdisciplinary education in various food-related specialities Extensive experience in research, teaching, and collaboration with industries and policymakers Experts in food processing, safety, and supply chain management
University of Bonn (UNIB)	Internationally recognised for excellence in education and research Expertise in food chemistry, and raw materials science Focus on molecular food technology and food safety	Leading programs in Nutritional and Food Sciences Emphasis on a natural science approach in food technology – the leading professors are team renowned for research on secondary plant metabolites and food authentication Significant experience in teaching and research related to food chemistry and analysis
Aeres University of Applied Sciences (AERES)	Integrates education, research, and entrepreneurship Focus on sustainable and smart agri-food systems, business and science Utilises urban environment for experimental learning	Offers education from practical to Master's level Emphasis on speciality issues within the food and agriculture industry Research on city-region food systems and sustainable food innovation Expertise in food systems transition and leadership development

Table 4. Project results.

Project Result	Lead Partner	Participating Partners	Timeline	Description
SafeFood4EU Glossary and Co-Working Guidance	UNIB	UFT, AERES	Month 1 - Month 6	The elaboration of the glossary and guidance is crucial for curriculum development and student involvement.
SafeFood4EU Curriculum	UFT	UNIB, AERES	Month 4 - Month 18	Curriculum development covers various thematic fields, including food processing, safety, toxicology, design thinking, and sustainable food systems.
SafeFood4EU Collaborative Learning Platform	AERES	UNIB, UFT	Month 7 - Month 24	Development of a COIL inspired digital learning platform based on Canvas for collaborative teamwork.

The higher education courses and programs created and extended by the implementation of the SafeFood4EU teaching and learning contents have become an essential and fixed part of the education process in the partner Universities, and this has made them sustainable in long-term and open and available to anyone willing to access and utilise them. An international Joint Degree Master Program on the SafeFood4EU topics was considered during and after the project duration of SafeFood4EU, and afterwards, its design and national accreditation in all three partner countries were pursued. It was envisaged to address the relevant ERASMUS funding instruments for this purpose (e.g. ERASMUS Mundus), as well as the local and regional industrial stakeholders regarding the co-financing of such a large-scale undertaking, which has provided added value to the entire set of relevant stakeholders, by generating internationally trained and experienced interdisciplinary thinking and working professionals, who will shape the sustainable and resource-efficient decentralised agri-food systems of tomorrow. Upon completion of the project, interactive educational resources will be available to all stakeholders. In addition, they have been developed and improved so that they can also be used by users outside the higher education system - training centres, business organisations, and enterprises. The digital format, a "living document" of all project outcomes in Canvas, has adapted these to other entities' needs, transferred them to new fields, and will influence future higher education and agri-food policies and practices. Maintaining and updating content, domain, and hosting of the platform on which the created content has been uploaded will be part of UFT's responsibilities during and after the project's duration. The broad public awareness of the innovative educational resources of the project will create aspirations for creating such on other topics in the field of technical specialities for Bachelor's and Master's degrees.

The Sustainable Development Goals (SDGs) are global goals adopted by all United Nations Member States in 2015. This is a universal call for action to protect the planet, reduce the human impact on the environment, end poverty, and ensure that all people will live healthy and sustainable lives in peace and prosperity by 2030. Implementing these 17 Global goals will contribute to balancing social, economic and environmental sustainability. The Sustainable Development Goals are an urgent call for action by all countries in a global partnership. The project and the selected courses address several of these objectives. Goal 2 focuses mainly on malnutrition, economic growth, and increased agricultural productivity. The focus of SafeFood4EU is food supply chain management, sustainable food systems, and the quality of raw materials. Decentralisation of agri-food supply chains will ensure infrastructure investment and improve agricultural productivity. Selected courses will demonstrate the types of supply chains, industries and technologies that can support the delivery of agricultural and food products. This is the key to providing solutions, developing sustainable food technologies and making food affordable and better for more regions. It will also contribute to Goal 6, notably Target 6.3: "By 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.". Improving and decentralising agri-food industries will reduce water and environmental pollution and make settlements more resilient towards the desired level of environmental risk mitigation. Further projects in the relevant field will be performed to follow up on the activities.

Quality control and impact

UFT has a functioning system for ensuring self-assessment and quality management of higher education and training, which has been applied to evaluate the quality of project results regularly. A questionnaire was developed, and a survey based on it was conducted with students, teachers, and employers from the expertise areas in which the project is being developed so that the degree of achievement of project results is well tracked. The teachers' survey provided insights into the level of educational resources that increase the quality and satisfaction of their work. The benchmarks are a crucial increase in interest for their classes measured by the number of participating students, an increase in student achievement in the relevant subjects, and recognition of increased satisfaction with their classroom work. The student survey has tracked the extent to which an innovative educational resource increases the degree of understanding and absorption of the learning material, the degree of confidence that they can handle an actual workflow, and the degree of confidence they can handle such during internships. Indicators of measurement are high test scores and high evaluation of students' work by employers during internships. In the long-term perspective, the most objective indicator of the project's success and the achievement of its objectives has been the number of students who have quickly found a job in their speciality and have thus helped to steady the development of the regional and European economy. This could not be monitored during the duration of the project. The objectives mentioned above and the level of their reaching have been qualitatively and quantitatively measured as follows:

+ The number of students chosen/elected the SafeFood4EU courses, programs and training from the point of time of the release of Project Result 2. and 3., as well as since its implementation and the creation of new higher education courses and programs related to the SafeFood4EU thematic field

+ The number of teachers involved in the SafeFood4EU courses, programs, and training. There was an increase in the number of teachers at the partner organisations due to the SafeFood4EU needs of relevant majors in the long term.

+ The number of the PhD students involved in the SafeFood4EU content development.

Implementation

The three partner organisations have cooperated in achieving the project objectives by implementing the SafeFood4EU

collaborative interactive and cross-national teaching/learning content and learning platform in their education courses and programs. These have integrated the SafeFood4EU contents into their current courses and programmes and created new ones. The project team has set the foundation for a wide range of future educational activities with applied research relations by elaborating and test-implementing a solid toolkit of strongly interdisciplinary teaching courses in the field of decentralised sustainable agri-food supply chains by integrating cutting-edge know-how on a practical, theoretical and political level, to prepare future experts for the challenging tasks in the agri-food business in all of its forms.

The project coordinating partner at SafeFood4EU is UFT, and it has coordinated the project actions by constantly having multilateral discussions and brainstorming activities with all partners to balance and possibly optimally elaborate and deliver the project results. The project communication has been performed chiefly via online conference meetings of the overall project team and in focus groups. Communication and collaboration between all partner organisations have been conducted in the same manner as until the project proposal submission, which was done transparently and clearly through regular online conference calls with all partners. Four transnational consortial meetings were planned, where all three partner organisations were represented and actively brainstormed and discussed the occurring and planned issues - two in Bulgaria, one in Germany, and one in the Netherlands. It was envisaged that the SafeFood4EU collaborative cross-national learning platform be designed and deployed in the platform of Canvas, and the project team has used these for its internal communication as well. These tools have both been applied by the SafeFood4EU team because of their broad application possibilities and easy access. A large-scale final project conference, combined with the final project meeting, has taken place at the end of the project. Outcomes, trends, and future collaboration topics and necessities have been discussed in larger round tables and thematic workshops.

The SafeFood4EU project team has used the Erasmus+ Project Results Platform for the implementation of the project goals and needed measures, as well as the dissemination, in terms of co-development and more comprehensive discussions also with non-direct-partner institutions on the elaboration and implementation of the envisaged SafeFood4EU Curriculum (Project Result 2) and the SafeFood4EU collaborative learning platform (Project Result 3). All project partners are familiar and experienced with the daily use of the Erasmus+ Project Results Platform. It was crucial to enable university students' teaching/learning content to become discussed, and not directly participating partners critically observed its development during the project runtime. This, especially in the network of past and active Erasmus+ projects in Higher Education Strategic Cooperations, has made it possible to obtain valuable feedback from experts from the entire EU. Therefore, the SafeFood4EU team has provided access to the Project Results at critical points in time of the development process of - the draft publication of the Learning content (Project Result 2.) and the pre-launch phase of the interactive learning platform (Project Result 3), as well as the envisaged SafeFood 4 EU Glossary and Co-Working Guidance (Project Result 1.) in the beginning. By this, failure avoidance and content/interface optimisation have been possible as a living lab, supported by the actively participating organisations at the Erasmus+ Project Results Platform.

Multiplier events

UFT is well known at the regional level for organising an annual scientific conference where partners from abroad are invited as guest lecturers to present different aspects and advances in Food Science, Food Processing, Food Safety and Quality Management. In line with the Farm to Fork Strategy and the EU Green Deal, thematic areas from the SafeFood4EU project have been integrated as a specific conference stream at the UFT's EU-wide well-known Scientific and Applied Research Annual Conference with International Participation "FOOD SCIENCE, ENGINEERING AND TECHNOLOGY". This has served as a Multiplier Event on a national and European scale, in which target groups include relevant students, teachers, young professionals, NGOs, policy-making organisations, and businesses from Bulgaria and the entire EU. Workshops at the same venue have also been planned to increase awareness and bring more knowledge about the transformative changes we need to understand and follow to achieve more sustainable Food Systems, Green Environment and Healthy Food.

The final project event was combined with an international conference at UFT dedicated to the project topic, which attracted relevant researchers and teachers from Portugal, Greece, and Turkey. It offered high-impact dissemination through hosting over 100 national and international guests and an interactive online quality feedback survey on the SafeFood4EU results, accessible through a QR code and accessed and answered by dozens of guests. It was envisaged to organise a workshop in the framework of the envisaged Final conference where to present and discuss the significant outcomes of the initiative in the context of the SafeFood4EU aims and project results, the sustainability agenda of UNIB, as well as the current developments in the framework of the EU Farm-to-Fork Strategy and the European Green Deal. Aeres had opportunities to discuss and present the project advancements within several events to national and international guests through the Aeres International Week, international events like Floriade 2022, and through other Erasmus projects to project partners for demonstration and inspiration.

Long-Term Impact: The ultimate indicator of project success will be the number of students who quickly secure relevant jobs after graduation, contributing to a more robust regional and European economy. Other quality indicators include: a) the number of students enrolled in SafeFood4EU courses and programs, b) the number of teachers involved in SafeFood4EU curriculum delivery, and c) the number of PhD students contributing to content development.

Methods

The project methods are presented in three phases: preparation, deployment, and feedback. In the preparation, the course content was developed, drawing on the expertise

of academicians involved in the project. The project partners followed the constructive alignment theory, in which the content, learning objectives, and working methods were designed before full course content development to reach the interdisciplinary curriculum goals. Course design varied per course/partner concerning the research-oriented vs practice-oriented universities involved. The educators' experience and continuous feedback loops were used to improve the course material and the learning management system (LMS), Canvas. In the preparation phase, the course content was uploaded onto the LMS Canvas following the COIL approach. European educators then rigorously reviewed the LMS and course content, ensuring quality, relevance, and cultural sensitivity. One of the crucial ways to evaluate the outcomes and the project's performance was by implementing feedback questionnaires both in the knowledge platform itself and at the final event. The surveys in the learning system are implemented in a way that serves as a prerequisite for completing a course to ensure that much-needed and valued feedback can be received. These surveys are the main mode of data collection reported in this paper.

The deployment phase was to demonstrate the SafeFood4EU project and its contents to stakeholders. Two modes of demonstration were used: a) the UFT SafeFood4EU Conference and b) an open prototype of the learning management system. In total, 38 industry experts, academicians, and graduate students were reached.

The final stage was data collection on the relevance and perceptions of the course content and overall course approach, where feedback was collected through an anonymous survey. This feedback was instrumental in refining the course material and integrating it into a user-friendly LMS. This prototype test course provided examples of content and delivery style and was evaluated using qualitative methods, focusing on the effectiveness of the course design in achieving its learning objectives. Further evaluation was conducted through feedback questionnaires integrated into the knowledge platform and distributed at the final event, ensuring a comprehensive understanding of the project's outcomes and performance. The data collection phase was surveyed for feedback amongst the academicians, industry experts, and graduate students. The questions in the survey focused on the relevance and perceptions of the course and its COIL-based learning platform, and they were mainly forced or limited-choice questions to avoid a middle-ground response. No personal data was collected in the survey, which was completely anonymous. Due to the high similarity of results between the English and Bulgarian data, the findings we presented here are based on the larger English-language dataset (23 respondents), with the understanding that the results likely generalise to the Bulgarian (15 respondents). References to the questionnaires can be found here: EN https://forms.gle/9NM9VVNkZSZrY4AR8; BG https://forms.gle/NybHaqCppTp1HKpm6

The survey results were displayed using descriptive statistics, which provided some insights into the perceptions of experts from industry and academia on the relevance and quality of the project, its curriculum, and its delivery.

Results

The results below first highlight the overall SafeFood4EU project results, followed by the feedback survey results.

Project results

Project result 1: food vocabulary support:

A unified glossary of professional terms and guidelines for communication and interaction was developed to ensure clear communication and collaboration within this interdisciplinary project. This glossary addresses students' decline in professional language skills and prepares them for the expectations of the field.

Project results 2: curriculum development:

The project produced a unique, interdisciplinary curriculum addressing sustainable, decentralised agri-food systems. This responds to food quality, safety, security, fraud, environmental impact, and supply chain logistics challenges. Key material include:

- Food Safety: Quality and preservation of raw materials throughout the supply chain.
- Sustainable Food Supply Chains: Decentralisation methods, supply chain management, and innovative approaches to reduce waste.
- Food Raw Materials: Sustainable food production methods, quality and safety of raw materials.
- Soft Skills: Professional vocabulary, communication, digital collaboration tools, and EU regulatory landscape.

Project result 3: online platform for coil

To make the curriculum accessible, the project built an interactive online learning platform. This platform facilitates knowledge dissemination, collaborative learning, and access to resources on decentralised agri-food systems. Aeres contributed expertise on coil models to enhance the student experience.

Feedback results

As discussed in the previous section, quality feedback has been an essential part of the project, and respective tools have been integrated into the knowledge transfer platform provided by Aeres. Interactive quality feedback surveys were performed—one for the final event attendees and one for the learning platform users. The survey for course materials users is obligatory for completing each course. The results of the survey follow.

The figures below present the final event attendees' survey results. A total of 23 respondents participated in the English survey presented below (15 Bulgarian not shown)—Figure 1 to Figure 3 show demographic information about the respondents.

Figure 1. Shows the age range of the survey participants, with the majority (78.3%) falling within the 30–65 age group.

Figure 2 shows the occupations of the survey participants, with the majority (65.2%) being academics.

Figure 3. Shows the number of professionals active in the agri-food sector who participated in the survey, with 82.6% responding affirmatively.

Figure 4 shows the overall impression of the presented learning content, highlighting a 69.6% excellent impression, a 26.1 % good impression, and approximately a 4 % insufficient impression. Most of the survey participants responded with a positive impression towards the project's curriculum and results. Also, an overall good score was given to how SafeFood4EU enables the interdisciplinary, learner-learner, and learner-teacher interaction, which is essential for the effective transfer of knowledge. In line with this aspect, the respondents overall consider that the courses' content, design and transfer are optimally well enabling an efficient learning process.

Most survey attendees belong to the active professional group in the relevant interdisciplinary professional domain of the project, and happily, interested experts from other domains who attended the final project event answered it. The majority expressed a favourable opinion towards the project concept and expressed a desire to enrol in a master's program based on safefood4eu (Figure 5). This shows the value the idea provides and the relevancy of the project's contents to the modern environment. Concerning the project knowledge transfer approach (Figure 6), the majority (95.7%) believe that it has

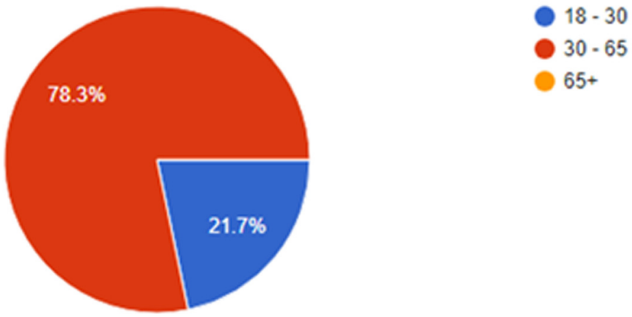


Figure 1. Age range of participants.

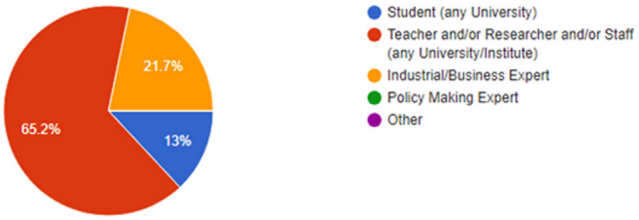


Figure 2. Participants' occupation.

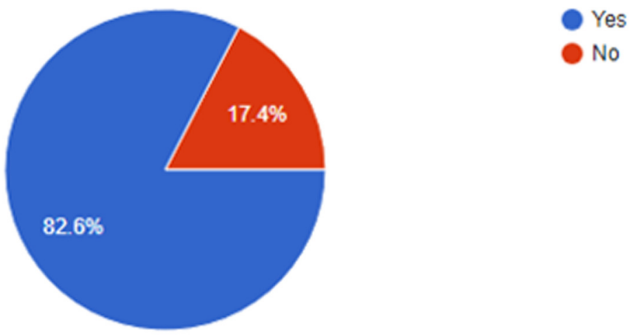


Figure 3. Professionals active in the agri-food sector.

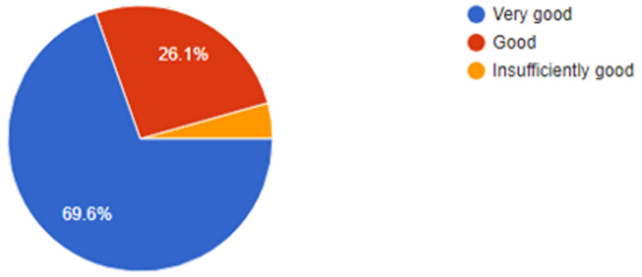


Figure 4. Overall impression of the learning concept.

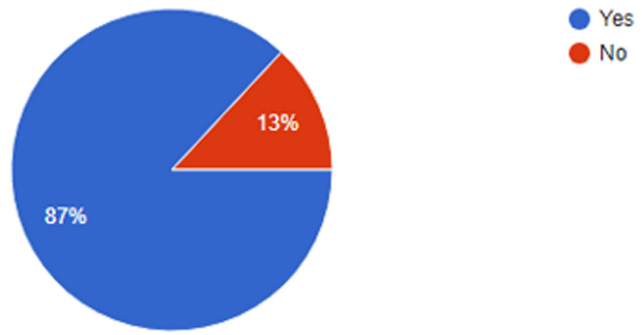


Figure 5. Imagined course participation.

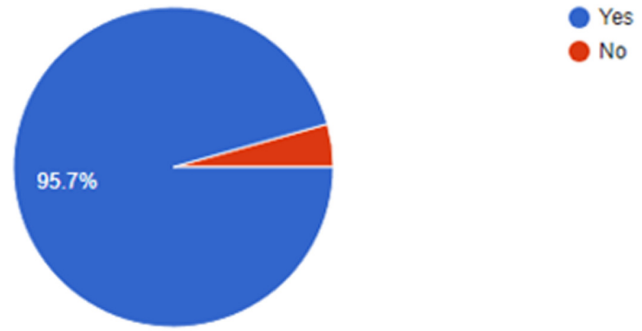


Figure 6. Safefood4eu interdisciplinary knowledge transfer success assessment.

successfully delivered adequate interdisciplinary preparation of currently highly needed agri-food experts and that the team should continue working in the same direction. This implies that the topics of the project are highly relevant to the european agri-food context and that there is a need to have future experts who can tackle essential challenges.

Figure 7 shows the direction of SafeFood4EU's future development according to survey participants, with 95.7% favouring the development of a master's program.

Figure 8 shows the overall perception of the safefood4eu curriculum and results, with 48% rating it as positive.

The same applies to the project's ability to provide europe with the necessary knowledge base to create and prepare high-quality experts (Figure 9).

Overall, the attitude of the surveyed participants among the learners and the attendees at the final project event towards the project and its systemic approach in structuring knowledge and transferring it to the learners has been highly positive in both the English survey results shown above and the Bulgarian language survey results, with every question receiving a majority of positive answers. The respondents agree about the project's value to the agri-food sector and the direction the project is moving. Areas in which significant further improvement can be conducted are learner-learner and learner-teacher interactions, as well as the courses' content design and transfer for an even more efficient learning process.

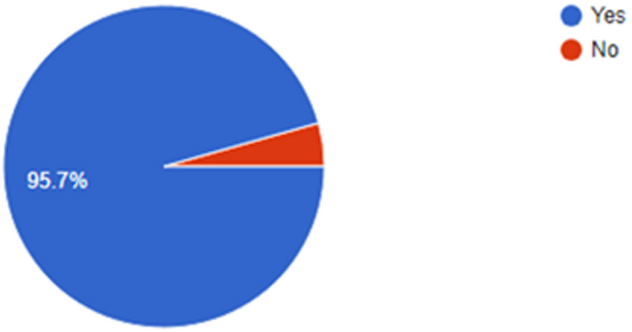


Figure 7. Direction of safefood4eu future development.

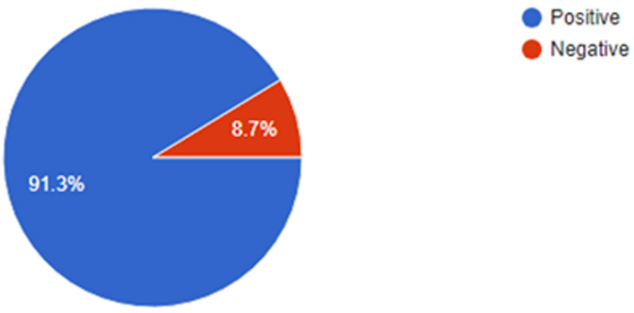


Figure 8. Overall perception of safefood4eu curriculum and results.

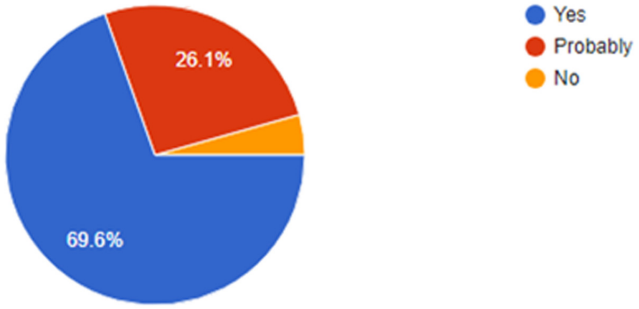


Figure 9. Responses towards the ability of safefood4eu to provide the basis for the delivery of quality experts in the agri-food sector.

Discussion and implications

The SafeFood4EU project reported in this paper holds promise to equip a new generation of experts with the skills to tackle the increasingly complex food system issues around food safety and sustainability like those highlighted in existing work[8]. A user feedback questionnaire was implemented to evaluate and improve the curriculum. This will continue to be implemented throughout the course, ensuring its effectiveness and relevance for years to come. The SafeFood4EU project has received mainly positive feedback from industry experts, academicians, and graduate students on its content and delivery. The SafeFood4EU project curriculum addresses the economic, social and ecological areas across food systems, providing insights into improving food safety and quality, reducing waste across the chain, re-designing food systems through transitions, and improving efficiency, such as through digital technologies, providing the required skills to address known challenges in current food systems[38]. The learning management system based on COIL was also well received, where a large portion of the respondents viewed the online Master's program as one that may be interesting to them, highlighting its relevance not only to bachelor students[23], but also to Graduate students like those for whom SafeFood4EU is developed.

SafeFood4EU project was inspired by challenges and trends in the food system for today and tomorrow. This underpinning need for safer, more sustainable, and decentralised approaches to food production motivated the development of the course and its content, addressing a wide range of required supply and value chain practices in sustainable food systems and value chains like food safety, transparency through digital technology, supply chain relationships, and trust[39]. The SafeFood4EU project tackles these critical problems facing agri-food, including those identified as essential areas of focus in the literature, such as security, safety, fraud, unsustainable practices, and political instability (e.g. conflict). And the environmental burden of global supply chains. Creating content to support learning and development around such topics can help build

capacities in essential areas of current and future food systems, to re-organise, control and maintain, and further develop the system to meet the increasing pressures and address challenges.

The SafeFood4EU project offers several solutions, from a glossary to support agri-food literacy to advanced course material on safe and sustainable food systems and a unique course on soft skills to support both industry and academic career paths. The project and its deliverables build on the basic knowledge of bachelor graduates towards creating higher-level experts, as the curriculum empowers students to drive change in their respective industries, ensuring food safety and security and implementing sustainable practices. The program addresses key issue areas and allows (life-long) learners to understand, respond, and mitigate current challenges and risks, such as food waste, resource efficiency, and the safety of traditional crops, positioning graduates to respond to current and future demands. The content developed in the project promotes both traditional values (safe food, sustainability) and innovative trends (e.g. digitalisation, decentralisation) of food systems, as the curriculum explores regenerative agriculture practices and digital technologies, leading to sustainable solutions within the sector.

The SafeFood4EU project has also addressed the need for soft skills in higher education, in this case, within the agri-food domain. The project's emphasis on professional communication, digital literacy, and understanding of EU regulatory frameworks equips students with skills that they may not obtain in similar programs that focus little on soft skills. By developing these skills, the project offers an opportunity to enhance students' employability and empowers them to become influential voices in shaping more sustainable and resilient food systems.

Implications

The project's online learning management system, developed with COIL in mind, offers a unique learning platform for the students. As time progresses, research, technologies, and best practices must be updated within the platform to ensure that the content remains engaging, informative, and aligned with the evolving needs of the agri-food sector.

The project results of such an undertaking offer an opportunity for project partners to develop relevant joint Master's degrees in sustainable food systems to provide a more focused and specialised educational pathway for students seeking to deepen their expertise in this field. Follow-up projects and programs like Erasmus MUNDUS could foster greater collaboration between universities, attract a broader range of students, and ultimately contribute to a larger pool of qualified professionals capable of addressing the agri-food sector's complex challenges.

The project presented above, and similar ones, is an opportunity for enhancing collaboration between academic institutions and industry partners to bridge the gap between theory and practice. This can be achieved through internships, research collaborations, guest lectures, and other initiatives that provide students with real-world experience and expose them to the practical challenges and opportunities in the agri-food sector. It can also be done through direct project partnerships involving more food system stakeholders than only knowledge institutes.

The academic content offered by universities, particularly in scientific research and publication, can encourage more experts to pursue academic careers. This is demonstrated by UNIB's developed curriculum, which includes a unique course on scientific work, supporting early career orientation, professional collaboration, and publication activities. By fostering a stronger academic foundation, the project can contribute to developing a new generation of researchers and thought leaders who can drive innovation and advance knowledge in sustainable food systems.

Finally, the SafeFood4EU approach can support resilience in education, as it supports the first stage of resilience, that of resilience preparedness[40]. By being prepared for future global disruptions, SafeFood4EU not only provides a platform for safer and more resilient food systems but also for more resilient and accessible higher education.

Conclusion

The global and EU agri-food systems and supply chains face tremendous daily challenges that add significant risk to the safety and security of our food supplies. From climate change to various political and social crises to all aspects of sustainability, these are all challenges that future agri-food experts will have to tackle. With this in mind, the SafeFood4EU project team has provided one way to face these challenges and issues - by allowing students in the agri-food sector to enrich their knowledge on many relevant topics in their field, which will enable them to add extra value to their respective industries, as well as to improve their own skill sets that could assist them in their future endeavours. The subjects ranged from food safety and supply chain management to sustainable food systems and their design, food production and quality of raw materials, and digital and soft skills. Experts from industry and academia validated the relevance of the curriculum developed within the project and underlined the importance of continuing the efforts towards co-creating Joint Masters in the interdisciplinary field.

The project and results presented have limitations. The course content was developed by three universities across three areas. The content may need to be contextualised when moving further away from the participating regions to respond to the local needs of the market. Also, the feedback (38 in total, 23 provided here) may not be generalised to the global community of relevant food systems experts. Further feedback is needed to continue the enhancement and applicability of this project and for future projects.

Ethical approval and consent

The project did not require ethical approval as per the Aeres Ethics Applied Research Committee's guidelines, because it

was primarily focused on evaluating a course developed in our project, which does not classically fall under the scope of ethical review, as it is not typical primary or fundamental research data. Additionally, the feedback collection process was designed to be anonymous and voluntary, minimising potential ethical concerns. The project did not involve invasive procedures, medical research, or collecting personally identifiable information, aligning with the criteria for exemption from ethical approval outlined in the flowchart provided by the Committee.

Feedback regarding the SafeFood4EU was gathered through a voluntary and completely anonymous and untraceable online form (accessed only through a link or QR code), within the project runtime. Participants were over 18 (we did have one pre-qualification question with widespread age range to ensure this). Participants provided implied consent by choosing to complete the form by scanning the QR code or clicking the link and completing the form. They were free to discontinue participation at any time without consequence.

Data availability statement

All data collected is made avaiabile under Zenodo in the following files:

Zenodo: Eng SafeFood4EU Participants Feedback Survey, https://doi.org/10.5281/zenodo.13773743

Zenodo Bulgarian dataset SafeFood4EU Feedback on Project and Course Developed **https://doi.org/10.5281/zenodo.13773774**

This project contains the following underlying data:

SafeFood4EU_Feedback_EN.csv: Contains responses to the English version of the feedback questionnaire.

SafeFood4EU_Feedback_BG.csv: Contains responses to the Bulgarian version of the feedback questionnaire.

Details of license: Creative Commons Attribution 4.0 International (CC BY 4.0)

Extended data

NA

Reporting guidelines

NA

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References

1. Khan MA: **COVID-19's impact on higher education: a rapid review of early reactive literature.** *Educ Sci.* 2021; **11**(8): 421.
Publisher Full Text
2. Kumar A, Krishnamurthi R, Bhatia S, *et al.*: **Blended learning tools and practices: a comprehensive analysis.** *IEEE Access.* 2021; **9**: 85151–85197.
Publisher Full Text
3. Klaassen RG: **Interdisciplinary education: a case study.** *Eur J Eng Educ.* 2018; **43**(6): 842–859.
Publisher Full Text
4. Abbonizio JK, Ho SSY: **Students' perceptions of interdisciplinary coursework: an Australian case study of the master of environment and sustainability.** *Sustainability.* 2020; **12**(21): 8898.
Publisher Full Text
5. Pope H, de Frece A, Wells R, *et al.*: **Developing a functional food systems literacy for interdisciplinary dynamic learning networks.** *Front Sustain Food Syst.* 2021; **5**: 747627.
Publisher Full Text
6. Gola M, Brambilla A, Barach P, *et al.*: **Educational challenges in healthcare design: training multidisciplinary professionals for future hospitals and healthcare.** *Ann Ig.* 2020; **32**(5): 549–566.
PubMed Abstract | Publisher Full Text
7. Al-Taweel D, Al-Haqan A, Bajis D, *et al.*: **Multidisciplinary academic perspectives during the COVID-19 pandemic.** *Int J Health Plann Manage.* 2020; **35**(6): 1295–1301.
PubMed Abstract | Publisher Full Text | Free Full Text
8. Lähteenmäki-Uutela A, Rahikainen M, Lonkila A, *et al.*: **Alternative proteins and EU food law.** *Food Control.* 2021; **130**: 108336.
Publisher Full Text
9. Schulz B: **The importance of soft skills: education beyond academic knowledge**. 2008.
Reference Source
10. Qizi KNU: **Soft skills development in higher education.** *Univers J Educ Res.* 2020; **8**(5): 1916–1925.
Publisher Full Text
11. Lezoche M, Hernandez JE, del Mar Eva Alemany Díaz M, *et al.*: **Agri-Food 4.0: a survey of the supply chains and technologies for the future agriculture.** *Comput Ind.* 2020; **117**: 103187.
Publisher Full Text
12. Sofic A, Rakic S, Pezzotta G, *et al.*: **Smart and resilient transformation of manufacturing firms.** *Processes.* 2022; **10**(12): 2674.
Publisher Full Text
13. Bakalis S, Gerogiorgis D, Argyropoulos D, *et al.*: **Food industry 4.0: opportunities for a digital future.** In: *Food Engineering Innovations Across the Food Supply Chain.* Department of Food Science, University of Copenhagen, Rolighedsvej Frederiksberg, Denmark, 2021; 357–368.
Publisher Full Text
14. Miranda FJ, García-Gallego JM, Chamorro-Mera A, *et al.*: **A systematic review of the literature on agri-food business models: critical review and research agenda.** *Br Food J.* 2023; **125**(12): 4498–4517.
Publisher Full Text
15. Horváth D, Szabó RZ: **Driving forces and barriers of industry 4.0: do multinational and small and medium-sized companies have equal opportunities?** *Technol Forecast Soc Change.* 2019; **146**: 119–132.
Publisher Full Text
16. Tripathi SS, Brahma M, Sahay A: **Developing curriculum for industry 4.0: digital workplaces.** *High Educ Ski Work Learn.* 2020; **11**(1): 144–163.
Publisher Full Text
17. Doherty-Restrepo JL, Perez K, Creeden M, *et al.*: **Closing the gap between students' career readiness and employers' expectations: an innovative competency-based approach.** *Int J Innov Teach Learn High Educ.* 2023; **4**(1): 1–14.
Publisher Full Text

18. Oke A, Fernandes FAP: **Innovations in teaching and learning: exploring the perceptions of the education sector on the 4th Industrial Revolution (4IR).** *J Open Innov Technol Mark Complex.* 2020; **6**(2): 31.
Publisher Full Text

19. García JMGV M, García-Carmona M, Trujillo Torres JM, *et al.*: **Teacher training for educational change: the view of international experts.** *Contemp Educ Technol.* 2022; **14**(1): ep330.
Publisher Full Text

20. Acosta Castellanos PM, Queiruga-Dios A, Álvarez LG: **Inclusion of Education for Sustainable Development in environmental engineering. a systematic review.** *Sustainability.* 2021; **13**(18): 10180.
Publisher Full Text

21. Kioupi V, Voulvoulis N: **Education for sustainable development: a systemic framework for connecting the SDGs to educational outcomes.** *Sustainability.* 2019; **11**(21): 6104.
Publisher Full Text

22. Finnveden G, Schneider A: **Sustainable development in higher education—what sustainability skills do industry need?** *Sustainability.* 2023; **15**(5): 4044.
Publisher Full Text

23. Brudermann T, Aschemann R, Füllsack M, *et al.*: **Education for sustainable development 4.0: lessons learned from the University of Graz, Austria.** *Sustainability.* 2019; **11**(8): 2347.
Publisher Full Text

24. Chousou C, Mattas K: **Assessing consumer attitudes and perceptions towards food authenticity.** *Br Food J. ahead–of–p*. 2019.
Publisher Full Text

25. Ketelsen M, Janssen M, Hamm U: **Consumers' response to environmentally-friendly food packaging - a systematic review.** *J Clean Prod.* 2020; **254**: 120123.
Publisher Full Text

26. Mazzocchi C, Orsi L, Sali G: **Consumers' attitudes for sustainable mountain cheese.** *Sustainability.* 2021; **13**(4): 1743.
Publisher Full Text

27. Song X, Pendenza P, Navarro MD, *et al.*: **European consumers' perceptions and attitudes towards Non-Thermally Processed Fruit and Vegetable Products.** *Foods.* 2020; **9**(12): 1732.
PubMed Abstract | **Publisher Full Text** | **Free Full Text**

28. European Commission: **Netherlands – CAP strategic plan.** 2024.
Reference Source

29. Deloitte: **Net-positive future of food harvesting food and agriculture opportunities in the Netherlands.** 2022.
Reference Source

30. European Commission: **Germany – CAP strategic plan.** 2023.
Reference Source

31. International Trade Administration: **Germany - country commercial guide: agricultural sector.** 2023.
Reference Source

32. Dahm J: **German farmers hit by climate change impacts, new data shows.** *Euractiv de.* 2023.
Reference Source

33. Strotmann C, Baur V, Börnert N, *et al.*: **Generation and prevention of food waste in the German food service sector in the COVID-19 pandemic–digital approaches to encounter the pandemic related crisis.** *Socioecon Plann Sci.* 2022; **82**: 101104.
PubMed Abstract | **Publisher Full Text** | **Free Full Text**

34. European Commission: **Bulgaria – CAP strategic plan.** 2023.
Reference Source

35. Garnevska E, Edwards J, Vaughan R: **Current situation and perspective of the horticultural farms in bulgaria–case in the plovdiv region.** In: *Proceedings of the 16TH INTERNATIONAL FARM MANAGEMENT ASSOCIATION CONGRESS A VIBRANT RURAL ECONOMY–THE CHALLENGE FOR BALANCE*. 2007; 17.

36. Georgieva V, Kazandjiev V, Bozhanova V, *et al.*: **Climatic changes—a challenge for the Bulgarian farmers.** *Agriculture.* 2022; **12**: 2090.
Publisher Full Text

37. European Commission: **Farm to fork strategy: for a fair, healthy and environmentally-friendly food system.** *Commun from Comm to Eur Parliam Counc Eur Econ Soc Comm Comm Reg.* 2020; **381**: 1–9.
Reference Source

38. Iacovidou E, Hahladakis JN, Purnell P: **Systems thinking approach to understanding the challenges of achieving the Circular Economy.** *Environ Sci Pollut Res Int.* 2021; **28**(19): 24785–24806.
PubMed Abstract | **Publisher Full Text** | **Free Full Text**

39. Burgess PR, Sunmola FT, Wertheim-Heck S: **A review of supply chain quality management practices in sustainable food networks.** *Heliyon.* 2023; **9**(11): e21179.
PubMed Abstract | **Publisher Full Text** | **Free Full Text**

40. Medel K, Kousar R, Masood T: **A collaboration–resilience framework for disaster management supply networks: a case study of the Philippines.** *J Humanit Logist Supply Chain Manag.* 2020; **10**(4): 509–553.
Publisher Full Text

Open Peer Review

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Version 1

Reviewer Report 04 December 2024

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✗ **Riccardo Accorsi**
University of Bologna, Bologna, Italy

1. Is the work clearly and accurately presented and does it cite the current literature?
This paper falls within the design of learning paths and education to promote sustainable and safe food systems.
The motivations are clearly explained, so as the environment and needs for implementing novel educational strategies and interdisciplinary topics.
I feel that the literature should be more structured using a (or more) comprehensive table and characterization fields/columns to classify previous efforts from the literature. Does previous studies already treat this topic? how? which limitations they faced? etc.
2. If applicable, is the statistical analysis and its interpretation appropriate?
A more detailed analysis of results should be reported. Also, statistical confidence in the results considering the survey's sample would be a scientific-sound finding.
3. Are all the source data underlying the results available to ensure full reproducibility?
A more detailed description of the respondent sample characteristics is encouraged.
4. Are the conclusions drawn adequately supported by the results?
Is the sample somehow representative and significant? Clarify it.
5.
Is the case presented with sufficient detail to be useful for teaching or other practitioners?
A taxonomy of existing EU educational programmes on Sustainable and Safe food systems should be provided to benchmark the proposal against existing experiences. A table with qualitative and quantitative fields could be useful to understand which programmes are available, with which visibility, and with which topics.

Is the background of the case's history and progression described in sufficient detail?
Yes

Is the work clearly and accurately presented and does it cite the current literature?
Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Are all the source data underlying the results available to ensure full reproducibility?
Partly

Are the conclusions drawn adequately supported by the results?
No

Is the case presented with sufficient detail to be useful for teaching or other practitioners?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Industrial Engineering, Food Supply Chain Design and optimisation, Sustainable Food Systems, Food Value Chain, Sustainable Food Operations, Consumers awareness.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Author Response 24 Feb 2025

Georgi Georgiev

Good day,

As you might have understood, this paper is meant to present the results of an ERASMUS+ KA220 HED project. It is not a scientific project, but an education-focused one. Therefore I am not sure if your remarks regarding a scientific project`s paper literature review etc. are relevant here... Are you sure you didnt base your review mainly on the previous reviews? I hope there could be a bit more profound understanding on the purpose of this publicaiton - to present the project aims and results.

Please feel free to respond.
Thanks!
Regards,
G. Georgiev

Competing Interests: No competing interests were disclosed.

Reviewer Report 28 November 2024

https://doi.org/10.21956/openreseurope.19803.r46886

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Kieran Higgins
Ulster University, Coleraine, Northern Ireland, UK
Alison Calvert
Queen's University Belfast School of Biological Sciences (Ringgold ID: 98871), Belfast, Northern Ireland, UK

The article presents a commendable effort in addressing, through education, the need for sustainability in food systems through education. There is a clear and structured approach to developing a curriculum that is sufficiently interdisciplinary and addresses the complexities of current food systems and subsequent real-world challenges.

However, there are areas where the article could benefit from greater clarity and depth. For instance, while the methodology is well-documented, further elaboration on the pedagogical approaches used in the course design would provide additional insight.

Primarily, the paper needs a stronger connection to pedagogical theories through broader engagement with the relevant literature. One of the original contributions of the paper is the use of COIL, especially in this way. To better advocate (or not) for its continued use, further discussion of the background of COIL (for a non-specialist reader) and how this programme aligns with its principles is required.

The article could be better sited within the overall framework of Education for Sustainable Development (ESD), with greater and earlier reference made to the Sustainable Development Goals, but also to the competencies associated with ESD.

The paper would benefit from a more comprehensive alignment of educational material to highly relevant Sustainable Development Goals, specifically 12 (Responsible consumption & production) which in target 12.3, calls out ‘food losses along production and supply chains including post-harvest losses’

The survey data presented in the article provides valuable insights into the reception of the programme by stakeholders. However, some choices in collecting and analysing data need further examination. For example, the number of teachers or PhD students involved cannot be considered a valid indicator of success without further contextualisation or evidence of impact. Instead, the focus should be on measurable outcomes such as improvements in student learning, skill acquisition, or employability.

An increased level of detail regarding the data collection and analytical approaches employed is required to demonstrate scientific rigor.
Figures 1-9 do not illuminate the evaluation (especially as pie charts not reporting total sample size), with some mistakes or misrepresentation e.g. the text reads “Figure 4....highlighting a 69.6% excellent impression..” however excellent was not an option in the questionnaire and Figure 4 shows ‘very good’, and “Figure 8 shows the overall perception of the safefood4eu curriculum and

results, with 48% rating it as positive" yet Figure 8 itself has a 91.3% positivity rating.

Generally, the paper would benefit from a significant restructuring for clarity of the case study. We would suggest beginning with an overview of the thematic challenges first, followed by the background to the programme, then the programme structure, its evaluation and then the concluding discussion. At times the paper moves backwards and forwards between these areas which can be confusing for the reader. There could be more clarity and consistency on project objectives, and more concrete recommendations at the conclusion of the paper.

Accompanying this restructuring should be significant editing for conciseness. There is significant and unnecessary repetition of information which should be edited to provide a clear and succinct account of the project. Some sections, particularly those detailing the background and implications, could benefit from more concise language. Streamlining these sections would improve readability and ensure that key findings for the design of similar programmes are highlighted more effectively. For example, Table 1 does not add much to enhance the argument. A concise textual description of the unique country-specific challenges, with an emphasis on the shared regional challenges, would be sufficient. This would free up space for more substantive discussion of other elements.

Is the background of the case's history and progression described in sufficient detail?
Yes

Is the work clearly and accurately presented and does it cite the current literature?
No

If applicable, is the statistical analysis and its interpretation appropriate?
Partly

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
No

Is the case presented with sufficient detail to be useful for teaching or other practitioners?
No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Education for Sustainable Development, sustainability, sustainable food systems, food science.

We confirm that we have read this submission and believe that we have an appropriate level of expertise to state that we do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Author Response 24 Feb 2025

Georgi Georgiev

Good day,

As you might have understood, this paper is meant to present the results of an ERASMUS+ KA220 HED project. It is not a scientific project, but an education-focused one. Therefore I am not sure if your remarks regarding a scientific project`s paper literature review etc. are relevant here...

Please feel free to respond.
Thanks!
Regards,
G. Georgiev

Competing Interests: No competing interests were disclosed.

Reviewer Report 21 November 2024

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Giovanni Esposito
[1] Universite Libre de Bruxelles Centre d'Etudes et de Recherches en Administration Publique (Ringgold ID: 129211), Brussels, Brussels, Belgium
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Universite Libre de Bruxelles Centre d'Etudes et de Recherches en Administration Publique (Ringgold ID: 129211), Brussels, Brussels, Belgium

Peer Review Report on "SafeFood4EU: An Interdisciplinary Approach on Education for Sustainable Agri-food Systems in Europe"
The paper presents an engaging project, SafeFood4EU, focused on developing educational tools to support the transition to sustainable agri-food systems in Europe. Its structure and content, primarily organized as a project report, provide detailed insights into the project's background, methodology, outcomes, and implications.

General Observations on Structure
The introductory section reiterates the project's general concept, goals, and outcomes, leading to redundancy. A more concise introduction that transitions quickly into the paper's core would

improve its readability. Additionally, the paper is unbalanced, with 12 pages (excluding abstract and references), of which eight pages are introductory (including project background and motivation), half a page is dedicated to methods, two pages present results (including graphs), and the discussion and conclusion sections together account for less than two pages. To enhance its quality as a scientific publication, the article requires restructuring to balance the introduction, theory, methods, results, and discussion.
To strengthen its value as a research article, the paper also needs clearer positioning within existing academic debates, particularly concerning policy learning and professional awareness in sustainable food systems. Below are constructive suggestions to enhance the article's content and contribution to the literature.

1. Positioning within Existing Academic Debates

- **Integrate Literature on Consumer and Professional Awareness**: While much research has focused on consumer awareness in sustainable food systems, SafeFood4EU introduces an innovative angle by targeting professional awareness. By framing SafeFood4EU as an educational initiative for preparing future agri-food professionals with interdisciplinary knowledge, the paper could enrich the literature on awareness-raising in sustainability. This connection aligns with recent studies, such as Alberti et al. (2024) [Ref 1] , which emphasize the importance of consumer awareness. SafeFood4EU extends this conversation by focusing on professionals who indirectly influence consumer understanding through industry practices and policy-making.
- **Frame as an Action Research Project**: Positioning SafeFood4EU as an action research initiative would highlight its dual purpose: educating participants and generating insights applicable to sustainable food systems. This framing aligns with the project's objectives and underscores its contributions to immediate educational outcomes and long-term impacts on policy and industry.
- **Analyze Existing Education Programs in the Literature**: Since one of the project's stated long-term goals is to establish a Joint Master's Degree Program in decentralized agri-food systems, it would be appropriate to review existing programs in the EU and beyond. Identifying gaps or areas for improvement in current educational offerings would situate the project within ongoing academic and policy discussions on sustainable education. Journals like *Teaching Public Administration* could provide a platform for this analysis.
- **Strengthen Assumptions with Literature**: The project's goal of fostering a pool of well-educated experts to address sustainable food systems should be supported with literature demonstrating the demand for such expertise. Citing studies on the necessity of interdisciplinary approaches and the impact of education programs on sustainable food policy and industry would substantiate the appropriateness of the proposed solutions. In the reference list at the bottom of this peer review report you can find some potential readings.

2. Strengthen Contribution to Policy Learning Literature

Position as a Policy Learning Initiative: SafeFood4EU can be framed as a project that fosters policy learning, defined by Dunlop and Radaelli (2013) [Ref 2] as the updating of knowledge, beliefs, and practices through interactions among policy-relevant actors. Key policy learning elements relevant for this paper include:

- **Knowledge Sharing and Evidence Generation**: The interdisciplinary curriculum combines research and practical insights, generating evidence that supports policy development.

- **Academia-Industry Interactions**: Collaboration between academic institutions and industry professionals illustrates how the project fosters mutual learning and aligns academic training with real-world needs.
- **Workshops and Conferences as Learning Platforms**: Highlighting these events as policy learning spaces demonstrates their role in facilitating evidence exchange and discussion among stakeholders, including researchers, industry representatives, and policy-makers.
- **Alignment with EU Policy Goals**: The project's alignment with the EU Farm to Fork Strategy and Green Deal positions it as a model for adaptive learning in sustainable food policies.
- **Long-Term Policy Impact**: Graduates equipped with the project's interdisciplinary training will contribute to sustainable practices in the agri-food sector, influencing policy and industry decision-making.

3. Use Project Data as Evidence of Policy Learning
Leverage Feedback Data: The feedback surveys collected during the project offer empirical evidence of policy learning. Key areas to emphasize include:

- **Updated Knowledge and Perspectives**: Use survey data to demonstrate how participants' understanding of sustainable food systems evolved.
- **Interaction Quality**: Highlight positive feedback on the COIL platform, showing its effectiveness in fostering interdisciplinary exchanges critical for policy learning.
- **Interest in Joint Master's Program**: Strong interest in the proposed program can serve as evidence of the project's relevance and its potential for sustained, policy-relevant education.

4. Framing the Paper's Contribution

- **Reframe as a Case Study in Policy Learning**: Positioning SafeFood4EU as a case study illustrates how interdisciplinary education initiatives can serve as policy learning instruments. This approach highlights its replicability and value as a model for other regions and educational contexts.
- **Emphasize Replicability and Scalability**: By demonstrating how the project's framework could be applied to other sustainable education contexts, the paper can underscore its potential to influence broader policy and educational practices.

Overall Recommendation
Reframing the SafeFood4EU project within the literature on policy learning and sustainable food systems awareness can substantially enhance its value as a research article. By providing evidence of policy learning through feedback data, aligning the project with academic discussions, and presenting it as a replicable case study, the authors can strengthen the paper's impact and relevance in the fields of sustainable education and policy learning.
With these adjustments, the paper could make a significant contribution to research on sustainable food systems, interdisciplinary education, and the integration of policy learning into professional training.

Minor Comment
The text requires thorough proofreading to improve readability and precision. Overly long sentences should be shortened for clarity, and the use of excessive commas should be avoided. Linking words such as "however", "in addition," "furthermore," and "as a result" should be used appropriately to ensure logical progression.

References

Alberti, N., Esposito, G., & Ferrando, T. (2024). [Ref 1]
Dunlop, C. A., & Radaelli, C. M. (2013). [Ref 2]
Kabasa, J. D., Kirsten, J., & Minde, I. (2015). [Ref 3]

Kurtsal, Y., Rinaldi, G. M., Savini, F., Sirri, R., Melin, M., Pacetti, E., ... & Viaggi, D. (2024). [Ref 4]

Minde, I., Terblanche, S., Bashaasha, B., Madakadze, I. C., Snyder, J., & Mugisha, A. (2015). [Ref 5]

Rastorgueva, N., Lindner, L. F., Hansen, S. R., Migliorini, P., Knöbl, C. F., & Flynn, K. M. (2023). [ref 6]

References

1. Alberti N, Esposito G, Ferrando T: Organizing sustainable and fair agri-food systems: exploring the role of north-north alternative food networks in the European Union. *Agroecology and Sustainable Food Systems*. 2024; **48** (9): 1289-1330 Publisher Full Text
2. Dunlop C, Radaelli C: Systematising Policy Learning: From Monolith to Dimensions. *Political Studies*. 2013; **61** (3): 599-619 Publisher Full Text
3. Kabasa J, Kirsten J, Minde I: Implications of changing agri-food system structure for agricultural education and training in Sub-Saharan Africa. *Journal of Agribusiness in Developing and Emerging Economies*. 2015; **5** (2): 190-199 Publisher Full Text
4. Kurtsal Y, Rinaldi G, Savini F, Sirri R, et al.: Improving the Education and Training Policies of the Agri-Food and Forestry Sectors: Identifying New Strategies to Meet the Needs of the Sector and Farm-to-Fork Priorities. *Sustainability*. 2024; **16** (3). Publisher Full Text
5. Minde I, Terblanche S, Bashaasha B, Madakadze I, et al.: Challenges for agricultural education and training (AET) institutions in preparing growing student populations for productive careers in the agri-food system. *Journal of Agribusiness in Developing and Emerging Economies*. 2015; **5** (2): 137-169 Publisher Full Text
6. Rastorgueva N, Lindner L, Hansen S, Migliorini P, et al.: Views of Farmers and Other Agri-Food Stakeholders on Generic Skills for Transitioning toward Sustainable Food Systems. *Agronomy*. 2023; **13** (2). Publisher Full Text

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If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Are all the source data underlying the results available to ensure full reproducibility?

Partly

Are the conclusions drawn adequately supported by the results?

No

Is the case presented with sufficient detail to be useful for teaching or other practitioners?
No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: My team and I cover two relevant areas for this paper: (1) Public Policy and Administration; (2) Agroecology and Sustainable Food Systems Transition

We confirm that we have read this submission and believe that we have an appropriate level of expertise to state that we do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Author Response 24 Feb 2025

Georgi Georgiev

Good day,

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Thanks!
Regards,
G. Georgiev

Competing Interests: No competing interests were disclosed.