

EUT⁺

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D4.1.4a Sharing good practices

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Preamble

Task 4.1 of work package 4 named "Graduate schools for education inside the research" is aimed at restructuring research and formation within the European University of Technology (EUT+) in graduate schools, involving researchers, students, and also stakeholders in order to form knowledge creating teams around defined research topic areas. Such a structuring as labs or institutes, respectively, allows for a better integration of research and education at all levels, benefiting both researchers and students.

This deliverable represents the fifth deliverable of this task and documents the activities undertaken and results achieved since the beginning of EUT+ in continuation of the works reported in the first four deliverables on the subject of the design of graduate schools and a graduate curriculum. In the first deliverable 4.1.1 the design of graduate schools has been presented for serving as the strategic orientation document for the designing of the graduate schools within EUT+ with the graduate school structuration strategy of knowledge creating teams including postgraduate students and the EUT+ European Research Institutes (ERI). These outcomes were brought together and lead into the formulation of the EUT+ Memorandum of Agreement creation of European Research Institutes, the Related EUT+ Graduate Research School and Supporting Research Office as presented and detailed further in the second deliverable 4.1.2. In deliverable 4.1.3a the analysis and conclusions for the creation of graduate schools were described together with a general structuration proposition designed to fit the given development of the ERIs and their graduate schools as an extension of and adaption to the goals of the task. As a succession, the fourth deliverable shows the final configuration of the proposed EUT+ European Graduate Research School (EGRS) as a support office and the agreement concluded by all alliance members for its establishment is

presented. In this document, the development of a graduate curriculum is presented. It is designed as a pilot programme in the field of sustainability sciences and has led to a successful application for external funding.

1 Development of a Good Practice

1.1 Background

The task 4.1 Graduate schools for education inside the research labs is closely interlinked into the research-related work package 4. As the development of the EUT+ European Research Institutes (ERI) as reported in the previous deliverables is still work in progress at the time of the reporting here, as a consequence the emergence of the EUT+ Sustainability Lab is on the way and the institute or its focus and graduate school is not yet defined in detail.

However, as a support to the activities taking place surrounding the design and development of this institute, within task 4.1 the aim of forming knowledge-creating teams around certain defined topic areas was decoupled and approached in a stand-alone manner in parallel, but nevertheless closely connected. As set out in the EUT+ project description, it was undertaken to put a graduate school curriculum on sustainability sciences into place, also in a coordinated approach with the works in the ECT Lab+ and oriented at the model for doctoral studies in this field developed at h_da.

With dedicated individual researchers who have expressed their interest to become engaged in the forming of the EUT+ Sustainability Lab, a proposal and implementation of a graduate school curriculum for doctoral students in sustainability sciences has been created. It interconnects all partners and is intended to foster cooperative doctorates between the alliance members.

1.2 Key Elements

The development of an enriching curriculum has been created through close cooperation of researchers from the French alliance member UTT, in particular from the Charles Delaunay Institute and the branch Systèmes sociotechniques (SST) of the L'École doctorale Sciences pour l'Ingénieur, and the German alliance member h_da, in particular from the Doctoral Center Sustainability Sciences and the Graduate School Darmstadt. The given expertise and scientific approaches were combined for the design of the curriculum. In this, given experience and knowledge in this topic field was linked for seeding a first step.

Within all conceptual considerations, mobility builds the foundation for the joint activities. It is deemed fundamental to create cohesion and facilitate formal and informal exchange of information necessary to ensure team building and successful conduction of joint events, seminars and courses. Both researchers and post graduate students are to be encouraged to spend time at the partner universities, combining research and education activities, ideally, with several weeks up to one semester spent at a partner to become fully immersed into a European experience and advance the doctoral research topic with impulses and European perspectives.

1.3 Academic Topic of Sustainability Sciences for Curriculum Development

The inter- and transdisciplinary research field of sustainability sciences has established itself worldwide in recent years in view of global challenges such as adaptation to climate and environmental changes, possible shortages, for example, in the supply of energy and water, innovations in key technologies, international competitiveness or even questions of justice. Answers to the questions related to these issues can only be developed jointly and collectively. Solving environmental

problems and societal challenges cannot be a purely technical task. For this reason, sustainability sciences integrate several branches of science and research in order to gain insights into social, socio-economic, engineering and technical and natural sciences challenges in the sense of a "social shaping of technology". An essential requirement here is not to look at individual problems from separate disciplinary perspectives, but to enable a holistic, integrating view of the complex interplay of environment and society at the individual level as well as at the level of society as a whole. This requires a fundamentally new view of technologies and a change in the way people are educated to create innovations in this sense. In summary, sustainability sciences are concerned with the interactions between global, social and human systems, the complex mechanisms that lead to the degradation of these systems, and the associated risks to human well-being.

These sciences are only emerging, but are increasingly being taken into account in research programmes. The UN conventions on sustainable development provide the normative framework for research, and the sustainability science approach has found its way into policy. The question of implementation is primarily addressed to science itself, as well as to politics as a shaper of framework conditions. From the academic side, this is actively supported by the work of international research associations and councils, such as the International Council of Science or the Inter Academy Council as a worldwide association of national science academies with its demand for holistic research on science, technology and society. In the European Union, as well as at the level of the Member States, there are numerous research funding programmes that enable and actively promote innovative research and development in the fields of sustainability, as expressed in the European Green Deal.

1.4 Programme Content

The scientific field addressed in this doctoral programme developed aims at education and training in the sciences of sustainability in order to transform anthropological practices, especially technological ones. The doctoral students taught shall be able to innovate with scientific knowledge and develop their environmental, human and social responsibilities. The aim is to simultaneously promote early career researchers across countries, disciplines and cultures through various measures and - also in the long term - to strengthen the academic supervision of doctoral students in the thematic field of sustainability sciences. This should create the basis for a European education and research network. To this end, the competences at the alliance members shall be bundled. The proposed education programme aims to enable to:

- understand the limited possibilities of planet Earth,
- understand sustainability issues by dimension (from global to local),
- understand the impact of technology on the environment (social and environmental) in relation to the possible technological development paths and identify possible trade-offs,
- know the challenges of inter- and transdisciplinarity (definition and implementation in research).

Within the scope of this programme, various joint hybrid event formats are developed, which include face-to-face teaching and virtual teaching components. Design and delivery decisions are intended to be made ad hoc in accordance to the actual situation given considering learning performance, financial costs and environmental costs:

- workshops and joint courses on linguistic and intercultural competences,
- seminars and conferences on inter- and transdisciplinary issues,
- support of mobility by doctoral students and guest lecturers.

In addition, doctoral researchers are offered access to disciplinary teaching modules at the alliance members. This serves to open up interdisciplinary perspectives for the participants and to ensure that they have a professional foundation for their research works.

1.5 Programme Conduction

Doctoral researchers and supervising scientists are jointly involved in the design of the programmes, so that aspects of science management with interdisciplinary research as well as holistic support and training of young researchers are ensured. Young researchers are supported in learning another European language and in their mobility. They are also supported in implementing multidisciplinary approaches themselves, identifying interdisciplinary topics and putting interdisciplinary scientific activities on sustainability sciences on paper. In this way, young researchers also gain experience in research project management and in conducting scientific events during their doctorates.

2 Implementation as Pilot Programme

2.1 EUt+ Perspective and Roll-out Path

For starting to implement this programme a small scale beginning was decided for, as the conduction was to be carried solely by single researchers with support of the EGRS. The group is a team comprising scientists from the two alliance members from

France and Germany as described above for being active already during the preforming phase of the EUT+ Sustainability Institute. However, as part of the programme, lectures, joint events, keynotes and delivery of courses are foreseen including participation and contributions from all members of EUT+. As part of these discussions and also the joint work that has begun for the realisation of the European University of Technology EUT+, the idea of developing and actively living the cooperation of the two neighbouring countries as a seeding initiative for a joint doctoral programme at the European level arose as shown. As the participating academics in the doctoral programme development had already cooperated on specific research topics in the past this could be levelled up in this manner and expanded, thus building on the power of the alliance, so that through transnational research with a holistic approach, the doctoral students shall be enabled to contribute to shaping a common discourse on diversity and developing solutions for the societal challenges from a European perspective.

The desire to expand cooperation and bundle competencies arose from the conviction that answers to the diverse challenges in the field of sustainability sciences, as described in the Sustainable Development Goals adopted by the UN, can only be found meaningfully and in the long term in a joint, interdisciplinary and transnational manner. Thus, the training of young scientists is to become an integral part of a research career and form the core for future collaborations within EUT+.

Furthermore, foreseeing several steps on the path to a fully-fledged doctoral programme anchored in the institutes facilitates gaining first experiences and promote attraction, so that lessons learnt and best practices identified provide a basis for iterative improvements and adaptations upon including further participants into the programme so that the next steps of a graduate school within

the EUT+ Sustainability can be tackled based on first real-world experiences in doctoral studies.

The first events organized and held in 2021 and 2022 (winter seminars, workshop of the forming Sustainability Lab) have reinforced the structural concept and design of the programme in view of the feedback from the doctoral researchers about the experiences they have had and the questions they have raised there for their own research work.

2.2 Programme Funding

These first events showed active interest and participation so that it was decided to extend the seed initiative as a binational cooperation anchored within the EUT+ alliance as a pilot for the whole alliance. For this an application for a graduate school funding at the Franco-German University (FGU) was submitted. The FGU is a network of affiliated universities from France, Germany and other countries supporting and funding structured academic programmes. The choice was to apply for a DFDK/C DFA which is a Franco-German graduate school¹. The application was approved. Accordingly, this is additional funding obtained² and the joint works started in January 2023 by the name of “Deutsch-Französisches Doktorandenkolleg in den Nachhaltigkeitswissenschaften”³ (German-French Doctoral Programme in Sustainability Sciences).

¹ FGU DFDK/C DFA: What are the Franco-German graduate schools?. <https://www.dfh-ufa.org/en/programme/research-programmes/dfdk-cdfa-what-are-the-franco-german-graduate-schools>.

² Collèges doctoraux franco-allemands (C DFA) 2023 / Deutsch-Französische Doktorandenkollegs (DFDK) 2023. <https://www.dfh-ufa.org/app/uploads/2023/01/Doktorandenkollegs-2023a.pdf>

³ Deutsch-Französisches Doktorandenkolleg in den Nachhaltigkeitswissenschaften. <https://graduierenschule.h-da.de/deutsch-franzoesisches-doktorandenkolleg>

But most importantly, the design of the Franco-German graduate school explicitly includes the anchoring with EUT+ and participation potential for researchers from all partners. The inclusion of existing research and training activities of all the partners in the thematic field of sustainability sciences thus promotes, on the one hand, the in-depth training of the participating doctoral students and, on the other hand, the dissemination and participation of further researchers and doctoral students at the partner universities from thematically related fields and issues. These opportunities particularly encourage the transnational perspective of the programme. In this, the graduate school as a starter can pave the way.

3 Discussion and next steps

The obtaining of additional funding can be seen as an additional unforeseen outcome of the task. In addition to carrying out the development of a pilot programme together with individual potential members of the future EUT+ European Sustainability Institute within the task, the funding for starting the activities allows for starting the works and working with doctoral students accompanying the emerging ERI.

In principle, it is planned for graduate school participants to present on thematically appropriate tracks at the annual conferences of the EUT+ Sustainability Institute and to attend further workshops. All doctoral researchers should submit a contribution in order to receive feedback on their research from the scientific community.

Based on the experience gained, the conclusion of a cotutelle agreement is to be started to provide and securely establish a reliable institutional framework for the academic supervision of the doctoral students. From the very beginning, an international perspective will be a fundamental component in the choice of topics by the doctoral students. This takes into account the demands for an

interdisciplinary and holistic treatment of topics in sustainability sciences and emphasises the special character of this doctoral programme.

4 Conclusion

Through the capitalization of existing experience and courage to start a small scale pilot, the potential of creating European doctoral programmes could be demonstrated. It fosters research and research-related activities by putting an emphasis on intercampus links in the alliance as well as in relation with task 4.2, 4.3 and 4.5. Eventually such a step and the further development of the programme may serve as example for starting joint programme already at an early stage of an ERI and accompany its set-up and establishment, so that full courses and curricula for each graduate school, along with collaborative research projects comprising also a formation through a research approach can be following this path.