EUt+

European University of Technology

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D4.1.4b Sharing good practices

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Foreword

Deliverable 4.1.4b represents the sixth 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. It especially focuses on the conceptualisaation of an offer for good practices and highlights the design process. A second section of the document is dedicated to the support proposals to make it work and their need for the sustainability of the offer.

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Introduction

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 sixth 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 was 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 4.1.3b 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 the fifth deliverable 4.1.4.a 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. In this document here, the creation of an offer for the graduate school eventually emerging in the EUt+ European Research Institutes is described by presenting the background and conceptual design decisions together with the structuration proposition developed as a support offer for the research institutes.

1. Creation of an Offer for Good Practice

1.1 Background

As reported in the previous deliverables, so far at the time of this delivery of task 4.1 the EUt+ European Research Institutes (ERI) are still in their pre-phase of forming except for the European Culture and Technology Lab ECT Lab+, which has been established by agreement of all alliance members and started to be operational so that the forming of a graduate school and doctoral support activities could start there. The further planned ERIs are still in a forming pre-phase and the focus for developing a graduate school is not yet set. Hence, as a consequence, also so far no individual graduate schools in the institutes have yet been fully defined or even established. Yet the research agenda of an institute is to be seen as the factual, disciplinary and normative foundation for its structuring and successful operation. Accordingly, creating a graduate school in an institute is an indispensable part of the basic definition and this the laying of the groundworks.

Therefore, for being ready at the time of the institutes' emergence from the side of the EUt+ Graduate Research School to support for forward the institutes' activities, as a mitigation action the EUt+ Graduate Research School (EGRS) has been conceived to fulfill an office function and established as a structural element within EUt+ for supporting the works surrounding the creation of graduate schools in the institutes. In addition, as a first pilot programme usable as a small testbed, the creation and implementation of a curriculum of sustainability sciences as reported previously facilitates a possibility for gaining of knowledge and experience to guide the future works.

Having ensured the long-term operation of the EUt+ European Graduate Research School as the EUt+ office serving as the hub for linking (future) graduate and doctoral schools in the ERIs and member institutions, a seeding point for the

development of support measures for the structuring and iterative implementation of graduate schools and master-by-research programmes in the institutes when formed is intended to be given. The experiences obtained by developing the curriculum on sustainability sciences and the possibility to already participate in ECT Lab+'s beginning activities for doctoral students and support given during the preparation and applications of projects in this institute, e.g. the MSCA project EPISTEAM, allowed valuable insight for meaningful support measure design.

1.2 Conceptual Decisions

Creating support for the designing of a graduate school encompasses several aspects which are the level of students addressed, the type of offers to students and cross-linkage of disciplinarity as well as the member universities' structures and conditions. As these are the decisive factors for implementing programmes and devising events for post graduate students, the EGRS can complement domain- and discipline specific considerations at the time of the forming of an ERI from a supra-disciplinary and transversal perspective. In this the EGRS may ease the works and activities by bridging the ERI's prephases and connecting and supporting efforts from a central, even more holistic and overall perspective. In the following the design considerations for doing so are presented. The goal of the support measures created is to serve as suggestions and orientation for iterative implementations of graduate schools and master-by-research programmes in the institutes when formed. Thereby, from the more generic toolkit type propositions given here, successively adaptations according to an ERI's individual specifics can iteratively lead through successive implementation phases until a full installation of a graduate school.

1.3 Degree Level of Study Programmes

For developing research-oriented post graduate study programmes it needs to be differentiated between master and doctoral students as the expectations for fulfilling the requirements for obtaining the applicable degree are different with regards to depths and expectable degree of academic rigor and relevance.

A master-by-research degree is a postgraduate research degree offering student the development of their research skills as a preparation for possibly following doctoral studies. This is achieved through the emphasis on student research work. In contrast to traditional taught master programmes less importance is put on a successful completion of courses but more so on a practice-led research student project entailing less course attendance. Often, the resulting thesis is therefore more comprehensive then in traditional taught programmes. A doctoral student in comparison is expected to conduct his/her own independent academic work leading to new knowledge and an original academic contribution. These works as an early career stage researcher can be supported or guided by fully fledged doctoral study programmes or may be in the form of individual doctorates with or without accompanying studies. In this a huge spectrum of design options is to be looked at in depths.

1.4 Character of Offers

In general, studies offered can be full study programmes leading to the award of an academic degree. On the other hand, there is a range of complementary or even alternative offers that might be useful for postgraduate students along their way. Accompanying study offers and events may be of complementary character outside of study programme as additional in-depth offers that are not compulsory and meant to support individual skills and specific knowledge. These might be the teaching of research-related supra- or interdisciplinary qualifications or in-depth studies according to subject-specific aspects of the research conducted by a

student. Next to focused teaching activities, networking and experience in the scientific community may be addressed by seminars and conference attendances.

1.5 Mobility Enablement

For providing a European experience in EUt+, mobility enablement is to be included as a key element in any programme design in the ERIs, be it a full study programme or the offer of pointed complementary accompanying studies. In principle, a combination of long research stays in combination with visits and short stays facilitates a wide range of possibilities. Short stays can include visit to partners in research, exchanges or attendance of events and courses. Long stays can be included into a doctorate for lab visits to alliance members or even internships at non-academic partners having a different research infrastructure and offering an extension of experiments with other equipment or access to facilities. Here close cooperation with the activities in task 4.4. of work package 4 are important.

However, next to foreseeing long stays in form of placements and secondments the aspect of financing needs to be addressed as well and taken into account for facilitating a successful operation of a programme. In full study programme the inclusion of a semester at a partner institution may form a mandatory part relying on applicable Erasmus funding schemes. In addition, within an ERI applications for dedicated funding, e.g. through Marie Skłodowska-Curie Actions (MSCA) within the Horizon Europe programme might form a major part. Next to benefitting from funding obtained, already in the application stage the active inclusion of postgraduate students in the application preparation and submission can provide valuable training for them. Similarly, student involvement in the then following project management may further facilitate the obtaining of researcher skills for the future.

1.6 Offer Format

Depending on the type of course or event to be designed it needs to be decided which format for delivery might be suitable. This consideration needs to be taken for fully study programmes and the included modules and courses as well as for the delivery of single or stand-alone activities. Thereby, consideration should also be led by questions of dates and times, as EUt+ spans three time zones with differing semester times which need to be looked at to enable the organization regarding lectures times and availability of teachers or speakers.

In principle, the choice for formats is between online teaching, blended learning and courses with physical attendance. This depends partly on the type of course as training in laboratories cannot not be substituted in an online or virtual reality format. However, seminars might be considered as blended learning offers which may include the advantages of both worlds. Nevertheless, technical possibilities in form of suitable online learning tools maybe define or in some case constrain the scope possible. In addition, travel cost need to be taken into account in so far as to which funding scheme allows which forms of physical presence or mobility inclusion whereby environmental cost should not be neglected in the planning.

1.7 Scope of Disciplinarity

Within EUt+ the major institutes arising are at the time of writing this deliverable:

- European Culture and Technology Laboratory - ECT Lab+,
- EUt+ Sustainability Sciences Lab,
- European University of Technology Institute of Nanomaterials and Nanotechnologies – EUTINN,
- EUt+ Data Sciences Lab.

Of these institutes, two are having a trans- or interdisciplinary approach, while two are focused on a domain-specific topic gathering research strengths in a certain field. However, upon designing the graduate schools in these institutes, the design of postgraduate study programmes and accompanying offers are therefore expected to include domain specific and generic skills in varying pattern of composition and are expected to differ in this between considerable in content.

1.8 Linking of ERI Activities

Yet, in this diversity of institutes in development, there also lies a chance for joining efforts for and by the institutes. In particular, offers addressing generic topic-specific skills will likely be suited to the domain of an institutes. However, introductory courses or modules intended towards the challenges surrounding interdisciplinarity and challenge-based learning may possible by fruitfully combined. Especially interdisciplinary offers bear the chance to give new insights and impulses across disciplines, either potentially focus on certain topics or methodological aspects of such research. It may offer to student the contact with differing paradigms, approaches, and point of views onto societal challenges and identified problem to be researched. Furthermore, considering combinability and interchangeability may ease the design of attractive programmes and support later the delivery by experts at hand, potentially even in an exchange scheme between the ERIs.

Against this background also the joint delivery of doctoral courses and seminars may on the one hand provide impulses to the students and include them into a discourse from different perspective onto questions and challenges to be researched. On the other hand, the chance for a postgraduate student to present their research to different audiences allows to train their presentation and networking skills in an international setting.

Another focus in linking activities of an ERI might be the connecting to traditional study programmes as offered by the alliance members. For an early spread of information to bachelor students in order to raise awareness of possibilities within EUt+ and its research potential an inclusion of them might be foreseen through openness. Such an openness may be provided for example through opening poster sessions at the institutes workshops or the presentation of research results as discovery or show projects for which in turn the bachelor students can contribute in creating.

In general, the idea of open research and in this easier dissemination back into the EUt+ community by way of events as described can in turn enable a constant flow of young researchers.

1.9 Phase of Graduate School Development Status

The establishment of a graduate school and the inclusion of young researchers in an ERI might possibly be approached in several steps. As a first step postgraduate students being enrolled in their home institution working already on their thesis may form part of an institute and use the chance to extend their research work by including stays at one or more of the alliance partners.

As a next step, offers such as regular summer or winter schools can support dissemination and increase visibility of the institutes and its research potential and in this also rise interest in and the attractiveness of a European offer given by the chance to be included in a multinational environment.

Conferences and workshops held by an ERI provide chances for new potential postgraduate student to network and find an entry point for their research-oriented proceeding of their education, in particular in doctoral tracks or seminars co-hosted at such a conference.

In the long run, for developing study programmes in parallel, linking the institute members can provide the basis to design concepts for this. As a start the development of a joint programme offered jointly by some or all of the alliance members may allow for experimentation. Possible forms of degree awarding for such a programme might be a joint, double or multiple degree recognized by the member institutions providing the programme. Generally, such a degree is a single parchment nationally acknowledged as the recognized award of the joint programme and signed by the competent authorities of the institutions involved in the joint degree. For a joint doctoral study programme the pathway of a Erasmus Mundus Joint Doctorate (EMJD) may offer a starting point. For this the opportunity of exploring cotutelles in ascending order, meaning starting from joint supervision to joint degree whereby the given conditions needs to considered. The survey conducted previously has shown the questions to be answered in finding a common pathway, e.g. the need for double defence.

However, within EUt+ ultimately the development of a joint European degree for postgraduate studies on both master and doctoral level is aimed for. Thus the works for the creation are to be closely linked with the works for developing joint bachelor and taught master degrees.

1.10 Complementarity of Alliance Members

Coming together in EUt+ offers a chance for the members to extend their classical offer. This is in particular true for the offer of master-by-research programmes. The study conducted and reported on previously has revealed that such type of programme is not given with each member. Here the development and establishment would be an entering of new grounds.

However, all alliance members provide support for doctoral students in accordance to the national rules and regulations given. These offers can be analysed for the

purpose of linking and considering their potential for an extension onto an institute's graduate school, in particular if they are of supradisciplinary character as given in seminars for academic writing or research project management. Yet, the question of tuition fees needs to be looked at as well, as here some members do not charge fees, while at other members a variation of charges in different amounts exist. Nevertheless, in this lies a possibility for readily available offers on a national level that may be adapted for a European perspective.

A new possibility that may help in lifting existing courses or creating fundamentally new courses is the concept of Collaborative Online International Learning (COIL) which is an approach promoting the development of online formats for intercultural competence acquiring through sharing multicultural learning environments. First experiences at the German alliance member have been gathered and made available as a publication[1]. By connecting accredited courses and linking the classrooms of two or more higher education institutions, each located in a different country or cultural setting, students working together in mixed teams on a given task delivered in team-teaching and often also in blended formats, enables gaining intercultural awareness and understanding together with increasing digital literacy skills of teachers and students while at the same time generating a dynamic and inexpensive curricular internationalisation for the participating universities. In contrast to a standard online learning course, COIL is intended to link students enrolled in a course at their home institutions with students in a course enrolled in a geographically distant location thus also linking different experiences, expectations and perspectives in a shared course instead of just allowing for

[1] Fengel, J., Steffensen, B. (2023) E-dialogues as experimenting COIL – a case report from the European University of Technology EUt+. In Proceedings International Youth Conference with Participation of Renowned Scientists - "Engineering Infrastructure and Competitive Businesses". EUt+ Academic Press (accepted).

international students joining a course as well. Following this paradigm, as a first seed and pilot, at the German member of EUt+ activities were developed to create virtual academic collaboration on the European level with the goals of enabling the alliance members to integrate various digital collaboration formats into their teaching programmes and in the long term anchor them in the curricula. This could form the basis for students and teachers to apply the digital competences acquired through virtual cooperation. In addition, the expansion of the intercultural teaching offer ultimately also leads to a need for an expansion of the higher-level language offer for B2 and C1 level to support stays abroad and expansion of the university profile. Nevertheless, at the same time, the technical questions surrounding the digitalisation in higher education accompany such developments, as the existing processes in the area of study, teaching and blended mobility are to be digitised across universities and contribute to the development of interoperable student data ecosystems and data exchange.

Accordingly, within an ERI a mapping of the activities within the consortium and the institute's internal structures can provide a pathway towards designing and implementing a transformation plan from local to European offers as a collaborative action. In particular, an intercampus linking can then provide the basis for a dedicated specific forming of the applicable graduate school according to the set-up of the ERI, its members and the research agenda. Based on this, the inclusion of certain courses or research facilities deployment can be envisioned according to the topic field.

2. Support Proposals

For the goal of developing full courses and curricula for each graduate school, along with collaborative research projects as part of a formation through a research a-based approach it is assumed that each ERI will need to ground their activities into their research agenda. However, during the times of their emergence, as support in a general manner the development of proposals for support measures and suggestions for an iterative implementation of graduate schools and master-by-research programmes in the institutes when formed has been devised.

In the following a proposal for a skeleton structure for a master-by-research programme is presented. It shows a modular structure and encompasses a combination of courses for obtaining topic specific knowledge as well as generic researcher's skills. The basic idea is derived from a model as suggested by one of the partners and adapted. However, most importantly, this structure is not necessarily an exclusive pathways for student on master level. Upon the time of creation the level of each course can be well suited for master and doctoral students alike, especially doctoral student early on in their doctorate, or extended onto doctoral student being further advanced in their studies. Such courses can be organised in the ERIs for the different participants to be potentially expected. In this, economies of scale can be exploited. Besides, learning from more experienced who in turn learn to teach might be a beneficial side effect.

2.1 Master Level

As previously reported, the offer of a master-by-research is not given at all partners. In some countries this programme type is a new concept and so far unknown or avoided. Accordingly, at the time of developing such a path on master level, the

value of research orientation early on in the period of education could require more effort in demonstration the potential and benefits to students and universities alike. Here a combination of partner experience as might be given with an ERI after forming can be drawn on.

However, the development of a European master-by-research programme needs close cooperation between education and research expertise to fulfill all requirements for study programmes on a European level. In particular, alignment and adherence to the EUt+ standards and reference guide created is of the essence for ultimately obtaining the required quality and later accreditation.

The proposal created for an example skeleton structure is shown in Figure 1 and presents a matrix for combining teaching with research phases conducted by the student. The foundations (shown in light yellow) are accompanied by a deepening according to the topic of the research the student is intending to conduct (shown in darker yellow). This is supplemented with courses of a more general nature for teaching research as a discipline and academic endeavor (shown in dark green) together with courses for obtaining researcher skills per se around questions of research project management and result exploitation (shown in forest green).

	Lecture	Tutorial	Training	Seminar	Lecture	Tutorial	Training	Seminar	Lecture	Tutorial	Training	Seminar	Lecture	Tutorial	Training	Seminar	Lecture	Research	Seminar	Σ
7th Semester	Thematic Foundations I set as a compulsory basic course for a specific topic				Thematic Foundation II set as a compulsory basic course for a specific topic				General Academic Research Work Ia Methods of academic research and literature review				General Academic Research Work Ib Methods of academic research and philosophy of science				Master Project Independent research work (supervision by project supervisor)			
hours	3		1		3		1		1	1			1	1						12
ECTS	5				5								5					15		30
8th Semester	Topic-specific Subject Module I set as a compulsory basic course for a specific topic				Academic research Ia Compulsory elective module to be taken on a topic-specific basis				Research Management I Project management and research collaboration				Project Seminar I Academic presenting				Master Project Independent research work (supervision by project supervisor)			
hours	3		1		1		1		1	1						2				10
ECTS	5				2,5				2,5				5					15		30
9th Semester	Topic-specific Subject Modulel II set as a compulsory basic course for a specific topic				Academic Research Iib Compulsory elective module to be taken on a topic-specific basis				Research Management II Result exploitation and Entrepreneurship				Project Seminar II Academic publishing				Master Project Independent research work (supervision by project supervisor)			
hours	3		1		1		1		1	1						2				10
ECTS	5				2,5				2,5				5					15		30
10th Semester	Academic Writing Accompaying writing workshops				Masterarbeit (MA) Master thesis including accompanying seminar (25 CP)															
hours		1	1					2												4
ECTS	5				25															30
SWS																			Total	36
ECTS																			Total	120

Figure 1 Proposal for an Adaptable Skeleton Structure of a Master-by-Research Programme

In accordance to the student research topic in this scheme the master project is conducted under supervision and supported with taught modules fitting the research topic and individual research question addressed from a methodological as well as domain perspective. Project seminars prepare the student for presenting and publishing results while writing the thesis as a documentation of the research works and results achieved.

The scheme developed is shown here as a programme spanning four semester with a workload of 120 credits points. This is done for demonstration purposes. The structure shown forms the frame for explaining the programme itself that lead to the obtaining of the degree. For application of the concept, within an ERI it needs to

be defined how the domain specifics, individual considerations regarding duration and mobility inclusion are form the development. Thereby, the suggested scheme provides the grounds for such adaptations and potential Integrations of existing curricula.

2.2 Doctoral Level

The adaptable skeleton structure suggestion presented above contains all major fields for a postgraduate education. Accordingly, it may also serve as a basic suggestion for the content for designing relevant doctoral study programmes even though hereby the general decisions regarding scope and credit point obtaining requires extensive preparatory work upon designing such programmes for a joint European degree. Such a degree needs to include various objectives so that it will be a logical extension to the EUt+ pathway towards joint European master degrees. It has to be a joint European doctoral title awarding a doctorate with supervision of the doctoral candidate by supervisors obligatory from at least two alliance members universities including a mandatory longer stay in presence at one or several alliance members as well as a defined number of seminars, workshops and jointly offered courses and modules for researcher skills development and topic-specifics supporting the doctoral studies. For establishment common EUt+ structures for admission, selection, supervision and assessment are supportable with the EGRS. However, hereby, it is to be expected that specifics and traditions in the disciplines covered by the ERI in forming are of influence and potentially lead to differing outcomes. Yet, active inclusion of the researchers of an ERI already into ongoing doctorates by way of engaging them as reviewers may support understanding and joint learning for cooperating on developing the institute's graduate school in a beneficial way. As a guideline for the long-term goal of creating a European Degree

Labe and ultimately European degree fulfilling requirements in a recognizable manner the adherence to the suggested scheme may provide orientation.

Nevertheless, for truly beginning the creation of doctoral offers on a European level the creation of a frame for cotutelles can accompany the creation of a graduate school in forming taking into accounts the discipline and its traditions together with the institute members' requirements. In parallel, a course offering can start for linking and networking together with the beginning of doctoral student support activities development and implementation preparation in anticipation of the further ERI's graduate school creation and establishment as a potential pathway.

As the span of possibilities range from having no requirements in place for individual doctorates to a fully structured programme, a potential path at integrating might most likely include various steps in order to enable first experiences in joint training on different levels. For connecting and bringing together researchers and candidates the need for linking is of the essence for acquainting and extending existing doctoral works as a beginning and enabler for future doctoral students. Hereby the search and placement of supervisors and reviewers can be supported through the EGRS. At the same time, support in project design for obtained grants and research projects recruitment announcement and job posting might support the ERIs in forming. A forming factor hereby is to include stakeholder involvement possibilities into programmes and projects for keeping outreach and transfer in the research activities.

2.3 Action Fields

In general, postgraduate education trains and enables early career stage researchers to develop their ability for critical reflection for the development of an own research profile through fostering the interaction with doctoral peers from different research areas and environments as well as with non-academic

environments and integrate them in the relevant international scientific communities.

For the design a stepwise introduction of offers can support the ultimate goal. Starting to offer courses awarding collectible micro credentials opens up to students in all stages of their studies while at the same time facilitate iterative implementation and enhancement cycles. Hence, experience for the design of comprehensive study programmes leading to a certificate or label and in the end also a degree can be gathered.

Potential components stemming from a wide range of topics complementary to the focused training agenda can be created. Research training can be envisioned to be setup as per the individual research agenda of an ERI offering teaching in key areas such as methods of empirical analysis, qualitative and/or quantitative approaches in form of seminars or group meetings supplemented with the participation in research seminars at the institute with international speakers.

A complement can be seen in offering research school on topic outside of the domain. Organising EUt+ summer or winter schools on a regular basis with a focus on EUt+ vision and mission allows for joint events of the ERIs. Examples are seminars offered by the ECTLab+ on Ethics and Philosophy of Technology or the lecture series European identities. Here the ERIs, in particular the ERI active in an interdisciplinary field, have a chance to encompass postgraduate student education in a wholesome manner across discipline offering training and insights into cross-disciplinary questions and problem solving fields relating to technological research in EUt+ linking academic discourse from all angles together with the introduction of the paradigm of open research, open data and open access. In order to enable international experiences and academic networking on a European level, next to the offers by certain ERIs or local offers by the alliance members, dedicated EUt+

seminars can regularly foresee presentations by postgraduate student of their research in seminars and/or at annual events and workshops of EUt+. In addition, supporting the participation in relevant international conferences and workshops is trained for in this manner. Another aspect of training is the area of soft skills such as support for career development planning and career perspectives in an inclusive manner together with intercultural and language training which can be developed at the ERIs against the background of their discipline and the already available achievements of EUt+.

Combining the course possibilities as described into a meaningful programme, the suggested skeleton structure may potentially lead to a matrix helpful for an institute at the time of designing its graduate school.

3. Discussion and next steps

The presented support measures development for an iterative implementation of graduate schools and master-by-research programmes in the institutes when formed fulfills the given objective in a manner proactively adapted to the given situation for ensuring support and linking of graduate school activities meaningfully as intended and enabling continuous strong support for the emergence of the intended outcomes for the alliance over the coming time.

The first experiences made in creating postgraduate student support activities has begun by way of supporting project applications, offering events, lecture series and workshops as well as the establishment of a funded curriculum for doctoral studies in the field of sustainability sciences. These activities are to be permanently institutionalized and extended as a preparation for the time of the development and establishment of the graduate schools in the institutes.

Conclusion

The results presented here provide a basis for ensuring further developments and achievements in the field of postgraduate research at EUt+. The way towards this goal has been changed as needed according to the development stage of related activities within EUt+. In this on the other hand a chance has been taken up to create a generalized offer that in the future may be a basis for similar approaches. Hence, this also bears the chance on the other hand for having a ready-made offer to future research institutes of EUt+ coming into being that are not yet envisioned.