

SALEIE

**Strategic Alignment of Electrical and Information
Engineering in European Higher Education
Institutions.**

Progress Report

Public Part

Project information

Project acronym: SALEIE
Project title: Strategic Alignment of Electrical and Information Engineering in European Higher Education Institutions
Project number: 527877-LLP-1-2012-1-UK-ERASMUS-ENW
Sub-programme or KA: ERASMUS
Project website: <http://www.saleie.co.uk>

Reporting period: From 01/10/12
To 31/03/14
Report version: 1
Date of preparation: 1st April 2014

Beneficiary organisation: University of York

Project coordinator: Anthony Ward
Project coordinator organisation: University of York
Project coordinator telephone number: +44 1904 323021
Project coordinator email address: Tony.ward@york.ac.uk

This project has been funded with support from the European Commission.

This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

© 2008 Copyright Education, Audiovisual & Culture Executive Agency.

The document may be freely copied and distributed provided that no modifications are made, that the source is acknowledged and that this copyright notice is included.

Executive Summary

Over the past decade and into the future, as technology has advanced, we are experiencing an ever-increasing integration of electronics and information management in our daily work and lives. In present day and in future developments in products and services we are seeing an increasing dependence on electrical and electronics and information management (EIE). To remain competitive in the world market Europe needs to be able to respond to the challenges in key technical development areas with well qualified graduates. One way to achieve this is to prepare graduates to respond to the current global technical challenges in Green Energy, the Environment and Sustainability, Communications and IT, Health, and Modern Manufacturing Systems (including Robotics), that is, by adopting a “new skills for new jobs” approach.

Primarily through three interlinked themes, the SALEIE Project has this objective at its heart. The first theme is the characterisation and design of model curricula to meet the foreseeable future needs in a selected number of the key global technical challenge areas. This activity will provide institutions with model curricula they can use to build graduate capacity.

Certain parts of Europe are seeing a steady, but progressive decline in the number of students engaging with Electrical and Information Engineering subjects at the Higher Education level. The second project theme is to look at Widening Participation and access to the curricula, especially by disabled students. The objective of this theme is to look at barriers to maximizing the pool of potential graduates candidates and to propose ways of overcoming them.

It is widely accepted that experience, either in industry or in a different academic institution (usually in a different country) are valued components of the Higher Education process. Exchanges occur within well-established exchange systems such as ERASMUS, but also in ad hoc arrangements. The latter frequently introduces issues that can absorb a significant amount of time, reduce exchange efficiency and impact on the value of the experience for the student. The third theme of the project explores the more detailed issues of student exchanges between Higher Education Institutions in the EIE disciplines and will provide guidelines based on identified exemplars.

The project consortium comprises 44 European partners plus one “Third Country” partner from Russia. Within the partners we have three types of individuals, those who are teaching EIE subjects and can formulate effective curricula; experts in widening participation and supporting students with disabilities; and senior University administrators responsible and knowledgeable in the policies and practices of programme and module governance. This balance enables us to not only consider the three themes but to see and exploit the linkages between them making the project an integrated whole.

The SALEIE project has a clearly stated set of objectives in these three themes aimed at surveying current practice and identifying and promulgating exemplars that others within, and institutions outside the partnership can use for their benefit. Target groups are:

- Partners involved in the project consortium

- Creators of modules and programme curricula aimed at the key global challenges
- Those who teach and support students with disabilities
- Educational policy makers within academic institutions, Regional agencies and the European Union

At the midway stage of the project, we have undertaken desk research and partner surveys to understand the current situation. The resulting data has been used to home in on specific technical challenge areas and on aspects of governance and support for students with disabilities where there is significant variability in institutional practices. In the second half of the project we will finish the development of model curricula in the identified challenge areas and test these out in partner institutions and develop good practice guidelines in the areas of governance and widening participation and again initially test these in partners where there are acknowledged weaknesses.

Table of Contents

- 1. PROJECT OBJECTIVES 6
- 2. PROJECT APPROACH..... 7
- 3. PROJECT OUTCOMES & RESULTS 8
- 4. PARTNERSHIPS 15
- 5. PLANS FOR THE FUTURE..... 17
- 6. CONTRIBUTION TO EU POLICIES 20
- 7. REFERENCES..... 21

1. Project Objectives

The SALEIE project sets out to explore and then provide models for ways in which Higher Education Institutions of Europe in the Electrical and Information Engineering disciplines can respond to current challenges. The main challenges addressed are:

1. Ensuring graduates are prepared to enable Europe to respond to the current global technical challenges in the Green Energy the Environment and Sustainability, Communications and IT, Health, and Modern Manufacturing Systems (including Robotics), that is, a “new skills for new jobs” approach. This will embrace conventional education, lifelong learning and training for entrepreneurship.
2. Ensuring that programme and module governance is sufficiently well understood that issues of mobility, progression and employment are understandable by appropriate stakeholders including the accrediting bodies for professional engineers.
3. Ensuring all learners, irrespective of their background or personal challenges, including: dyslexia and dyspraxia; visual and audio impairments; and mental disabilities; are given equal opportunity to education and are appropriately supported;

The aims of this project are to investigate and explore these challenges and to:

- Build a shared understanding of the skills and competence needs of graduates to help European Companies respond to the current global technical challenges.
- Enhance current understanding of academic programmes and modules in terms of technical content and level of learner achievement as a means of improving clarity of learner skills and competence for mobility, academic progression and employment. At present careful scrutiny of application forms is often required when learners apply for academic experiences (such as work placements and ERASMUS exchanges) to fully understand how well the learner meets pre-requisite requirements; and how exchange programmes meet home institution requirements.
- Build a common understanding of current practices and issues associated with marketing programmes and the support of students from unconventional backgrounds and those with special needs. In this context special need are taken to include, but not be limited to students with: physical mobility problems; dyslexia and dyspraxia; visual and audio impairments; and mental disabilities. Students with special needs often require adjustments to be made to infrastructure and teaching practices, adjustments that need to be carried out with sensitivity to the students involved.

The specific objectives of this project are to produce:

- Model programme and module curricula in the current global technical challenge subjects;
- Support for students with learners with personal challenges during their study and when wishing to undertake periods of study abroad through ERASMUS exchanges, for example, Models for maximising accessibility of programmes to all learners;

2. Project Approach

The methodology that this project is following is to audit current practice, design new models, integrate the models into trial institutions, monitor and evaluate the trials and analyse, report and disseminate the findings.

As a first step questionnaire surveys have been used for an audit of the current situation and current practices in interest areas of this project. The surveys have been designed to audit:

- The skills required of graduates able to help industry to respond to the current global technical challenges.
- Programmes and modules that develop these key skills, the Institution offering them, their technical content and level of development.
- The volume and types of learners with specific needs that are currently registered on EIE programmes across Europe.
- Equal opportunities and diversity policies and practices.
- The level and types of support systems in place for these students.
- Policy and practices associated with programme and module specification including how well understood current specifications are to ERASMUS exchange partners and employers.

Supporting these questionnaires a meeting of partners' experts took place to decide on the appropriate questions to be asked so that the surveys generate value adding results. The surveys were designed by the end of month 3 of the project and issued to all partners and their networks for completion by the end of month 9. A report on the analysis of the survey finding was completed which provides a solid foundation for the design and development of models and trials for testing in project years 2 and 3.

In year 2, project meetings and small-scale conferences will be used to develop model programmes and module curricula in the global technical challenge subjects. Models for maximising accessibility of programmes to all learners; and for support for students and learners with personal challenges during their study and when wishing to undertake periods of study abroad through ERASMUS exchanges will also be developed.

The models will then be deployed into trial project partner institutions to assess their effectiveness from month 21 to month 30 (the academic year of the third project year).

At all stages throughout the project careful attention will be paid to the design and deployment of measurable indicators of our activities. For the surveys, number and breadth of respondents will be amongst the key measures. For the models more qualitative measures based on independent feedback (from non-partner HEIs and Industrial representatives) will be amongst the important measures. For the trial phase, feedback from the pilot institutions will be important quality indicators. Additional overall project performance indicators will be developed by the Quality work package team.

3. Project Outcomes & Results

The SALEIE Project is at its mid-term point so outcomes and results so far reflect the initial objectives of auditing current practice in respect of our three key themes. The project comprises three main interconnected themes as shown in Figure 1. The three main themes are *Key Global Challenges*, *Widening Participation & Disabilities* and *Governance*. In this project all three are explored specifically in relation to the Electrical and Information Engineering disciplines at the Higher Education academic level. The project focuses on optimising and aligning these three main themes to create the maximum number of engineers suitably qualified for the technical challenges Europe faces in the foreseeable future.

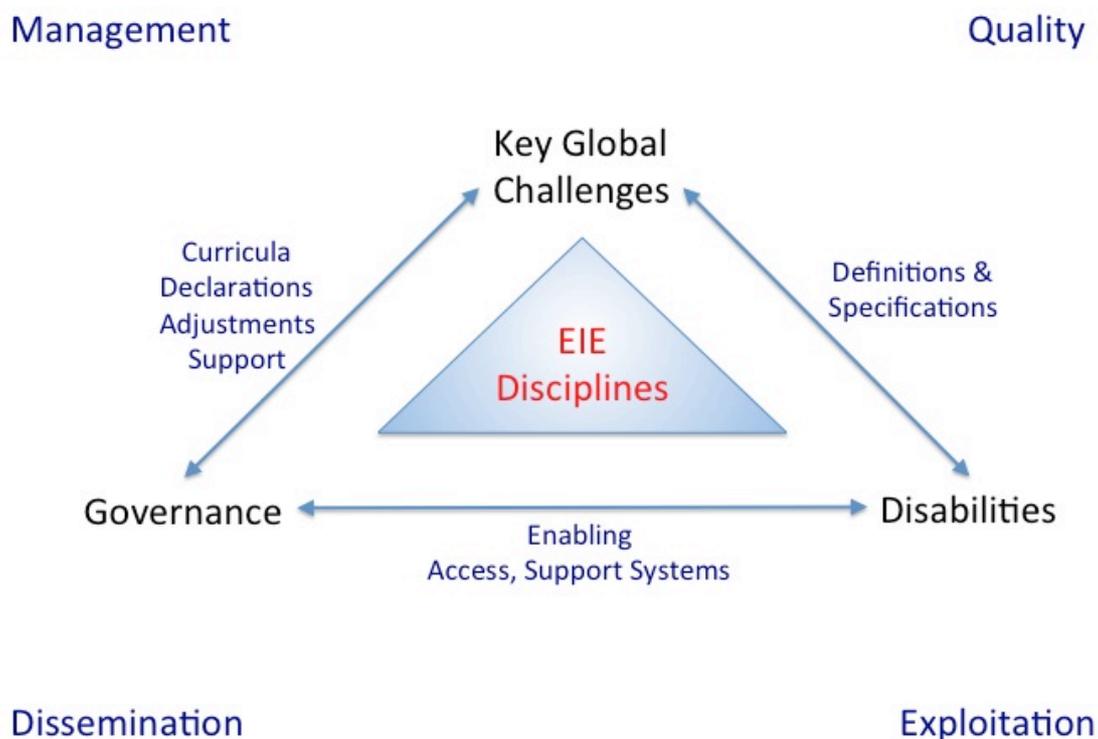


Figure 1. SALEIE Project Workpackages and Main Themes

Outcomes and results are described herein firstly for each of the three themes. This is followed by a description of the dissemination activities including publications produced relating to the project.

3.1 Technical Challenges

In the Technical Challenges workpackage the objective are to identify:

- The key challenges that affect Europe and that the project network can address and to offer proposals

- The skills required of graduates able to help industry to respond to the current global technical challenges.
- Programmes and modules that develop these key skills, the Institution offering them, their technical content and level of development.
- The volume and types of learners with specific needs that are currently registered on EIE programmes across Europe.

The generic structure of any programme, shown in Figure 2, including those orientated to the key global technical challenges comprise a set of technical modules including generic engineering and mathematics knowledge and skills built on a foundation of generic skills (sometimes called transferable skills), study skills and employability behaviours that prepare the graduate for employment. Pedagogy plays an important part in enabling learning especially for students with disabilities.



Figure 2. Generic construction of a study programme.

The first stage in the project was to undertake a ‘desk research’ exercise to identify existing programmes orientated to the key global challenges. This exercise produced two main results, firstly a report on the findings of the research and secondly key questions for a project partner survey on currently offered provision. The survey allowed us to produce a shortlist of the key technical challenges that the project network are in a good position to take forward to propose model programmes and modules that partners are able to develop and report on progress in the project

time available. Section 3.1.1 describes the 'desk research' report, 3.1.2 describes the survey and 3.1.3 the initial results of the survey.

3.1.1 Report on existing programmes orientated to the key global challenges [1]

This project report describes a review of the recognised Global Technical Challenges that was undertaken to lay a foundation for the choice of the challenge areas our project would focus on. From an initial list of 15 a shortlist of 5 were investigated more deeply. The 5 selected are:

1. ICT convergence challenges in education.
2. Science and technology challenges including robotics.
3. Energy challenges
4. Clean water & Sustainable development and climate change
5. Health issues

All of these areas require Electrical and Information engineers to take them forwards to make Europe competitive in the global market place. The report explores the current state of these areas and a number of specific sub-areas from a European perspective.

The report then explores the top-level criteria for curricula in these technical areas. The identified criteria include: *sector and academic relevance*; *flexibility* and responsiveness to changes in the technical area to enable it to remain up to date; *Modularity* to allow parts to be shared through student exchanges and placements; *Stakeholder involvement in design* including industry to ensure the skills required are being delivered by the programme; *Degree of interoperability* the support modules give each other in building a cohesive and comprehensive programme; *Degree of conduciveness* – in addition to providing qualified graduates this is the degree to which the programme can lead to further studies and the attainment of learner personal aspirations; *Learning Outcomes* – the need for clear and accurately definition both at the programme and modular levels of Knowledge, Skills and Competences linking in with the EQF; *Alignment of the programme a la Tuning Methodology*; *Balance* between the theoretical and/or conceptual elements and the practical application. A full list of these criteria can be found in the report.

Finally the report reviews current Higher Education provision across Europe building on work of previous EU Life Long Learning programmes and other sources. Noting a number of specific programmes currently available in European Universities in the technical challenge areas. This compendium of current programmes provides a solid foundation for building a better understanding of programmes and modules that will help Europe respond to the technical challenges for the future as our project will develop in its second half.

3.1.2 Survey [2]

The objective of this survey, issued both in paper form (pdf) and through the SurveyMonkey online survey service, is to gather information from partners about

their current provision of programmes aligned to the global technical challenges. Rather than being an 'end' in its own right, the survey is a 'means' to understanding the current capability within the project partnership, so of greater importance is the analysis of the survey results.

3.1.3 Report on the findings of the survey [3]

An initial report on the analysis of the survey results (n=39) was extracted from SurveyMonkey to enable the raw data to be explored. The report shows that, within the project partner institutions there is breadth and depth of programmes already considered aligned to the global challenges. The results also indicate a strong willingness to share experiences of teaching these modules across the project partnership. This analysis gives us confidence that we can produce a more detailed analysis of the challenge areas we will develop in the second half of the project.

3.2 Policy

In any student exchange it is important that the student chooses the institution, their 'exchange institution', they wish to undertake their exchange in and what modules they will study carefully to build on their 'home institution' programme. Care is needed to ensure:

- The student has the necessary academic pre-requisites to take the modules at their 'exchange institution'; and
- That the modules they choose provides them with the academic pre-requisites required to enable them to progress on their chosen programme at their 'host institution'.

A challenge often faced by both institutions is knowing sufficient about the modules to make a quality decision on preparedness. Where the exchange is under an institutional agreement, such as ERASMUS, a better understanding of the programmes that come under the exchange agreement is available. However, where module change is under the control of either institution there is still the possibility of 'drift' of the technical content of the programmes from what was known at the time the exchange agreement was signed. Where the exchange is outside an institutional agreement a considerable amount of administrative time can be absorbed by both institutions before the exchange is agreed.

The personal value of exchanges for the student is unquestioned. What is questioned in this project is how the exchange is 'managed' and whether the process leading to an exchange can be made more efficient. The first stage in the workpackage was to create a survey capturing relevant information to the governance of programmes across the project partners. The survey is described in section 3.2.1 including an overview of the findings of the survey.

3.2.1 Survey [4]

The objective of this survey, issued both in paper form (pdf) and through the SurveyMonkey online survey service, is to gather information from partners about the governance of their EIE programmes. The survey sought information about their provision at the Bachelor, Master, Doctoral levels and for their Lifelong Learning provision. Questions asked include: how new programmes and modules are

introduced, where the idea comes from, who gives approval; rules and regulations for module and programme changes; degree of similarity of programmes to others Nationally; who evaluates programmes; National institution, department and programme ranking systems; Student exchanges; Programme teaching and learning; Assessment practices; and Equal Opportunities policy.

Rather than being an 'end' in its own right, the survey is a 'means' to understanding the current capability within the project partnership, so of greater importance is the analysis of the survey results.

49 completed questionnaires have been received and analysed in an interim report. Not all European countries are represented in the results so far so a final report has not yet been produced. However, the results obtained to date ideas for new programmes come from, as might be expected, a wide range of sources. Of significance here is that, in a majority of cases the ideas do not come from Industrial Advisory Boards or Committees, most seem to come from faculty boards. Industrial Advisory Boards are more frequently involved in the design of the programmes, which gives confidence that they are being designed with genuine demand in mind.

In a number of respondents cases programme approval requires National legislative or National Executive staff in addition to University approval. This directly impacts responsiveness of these institutions to changes in demand. This in turn will affect their responsiveness to changes in the modern, very dynamic technical challenge areas. This potential problem is made worse because in some cases National legislative or the National Executive are involved in defining the programme structure and developed skills suggesting a very restricted ability of institutions in some countries to introduce programmes and make changes needed.

For 9 respondents new programmes need to become one other institutions can use by legislation. For 6 other respondents this is common practice in their country. This suggests a level of control is being exercised in the skills development at the National or Regional level – a positive policy if it is effectively informed by industrial needs.

The results of analysis of quality evaluation is very positive with just over 90% of respondents saying their programmes are subject to some form of periodic quality evaluation. In only about 50% of cases is there a National University ranking system and a much lower percentage of academic departmental and academic programme ranking.

A more detailed report on the findings of the survey will be produced in the second half of the project.

3.3 Widening Participation and Disabilities

3.3.1 Survey [5]

The objective of this survey, issued both in paper form (pdf) and through the SurveyMonkey online survey service, is to gather information from partners about their policy and practices towards students with disabilities. Questions asked include: about the perception of importance of supporting students with disabilities; information management and confidentiality; awareness of National regulations and policies; statistics specific disabilities; specific provision and adjustments and if so

who makes them and against what criteria or standard; does a student charter (or similar) exist; reporting requirements in respect of disabled students. These questions are asked at the institutional level and at the EIE departmental level to enable the relative distribution of students with disabilities in EIE to be tested.

Rather than being an 'end' in its own right, the survey is a 'means' to understanding the current capability within the project partnership, so of greater importance is the analysis of the survey results.

The survey has identified a number of areas of variability across Europe and areas where there are practices that are more restrictive in terms of widening access and how students with disabilities are supported. This understanding lays a solid foundation for more detailed investigations in the second half of the project and the documentation of different practices we observe across the project partnership.

A more detailed report on the findings of the survey will be produced in the second half of the project.

3.4 Dissemination

The first half of the project has been primarily focussed on understanding the current state of the project partners and to raise awareness of the project generally.

Dissemination activities have been directed towards the project website, general dissemination about the project and conference publications.

3.4.1 Project website

The primary method of generally informing about the project and its activities is the project website [6]. This site contains the project aims and objectives, presentations given at project meetings, details about project partners and associate partners and a link to the Student Support Centre, an embryonic portal that will include all information relating to the widening participation and disabilities outcomes of the project.

3.4.1 Project info sheet, newsletter

The first project newsletter was called a project info sheet – a two sided notification containing general details of the project [7]. A follow-up newsletter is also under development containing progress updates for the first half of the project.

3.4.1 Conference publications

The project partners have, over the first half of the project, been focussing on technical conferences as the main route to dissemination of the project technical. The following conference publications have either been delivered or are already accepted by a conference.

A general paper on the project was presented at the Project Dissemination Day on the 5th November 2013 at the University of Ruse "Angel Kanchev" [8]. A conference paper was also presented at Annual Scientific Conference of University of Ruse and Union of Scientists – Ruse, 25-26 October 2013, Ruse, Bulgaria [9].

Three project papers were presented at the European Association for Education in Electrical and Information Engineering annual conference in Chania, Crete in May 2013, [10 – 12] and a special session is being arranged for project papers in the 2014 conference.

A special session for project papers is also planned for the ITHET 2014 conference to be held in September 2014 in York, England.

A paper on how well we are meeting the educational expectations of EIE students was presented at the IETEC 2013 conference in Vietnam in November 2013 [13]. This paper won the best paper presentation award.

A paper on building a shared understanding of the skills and competences for the current global technical challenges has been accepted for presentation at the 2014 IEEE ECUCON Conference in April [14].

4. Partnerships

During the first half of the project the partners have been building a network of external partnerships to enrich the information available to the project and also to broaden the dissemination of its findings. External partners are arranged into Institutional partners, Associations and Collaborators.

4.1 Institutional partners

Institutional partners are Higher Education Institutions interested in the project's activities. The named contact at each institutional associate partner receives regular progress update emails and are invited to contribute to discussions and questionnaires.

The project currently has 8 institutional partners, the Universities of Derby and Sheffield in England; Kavala Institute of Technology, Greece; "Kyiv Polytechnic Institute" National Technical University of Ukraine; Trondheim Inst. Of environmental issues and water resources; Institute of Basic Science and Technology, Budapest, Hungary; Norwegian University of Science and Technology, Norway; Private Higher Educational Establishment "Bukovinian University", Ukraine.

4.2 Association partners

Association partners are Associations or other Projects with which the project has sufficient synergy that mutual recognition brings benefits. At present the European Association for Education in Electrical and Information Engineering (EAEEIE), the Association of Students with Disabilities, Politechnika Krakowska and the PRAXIS project are Association partners.

The EAEEIE [15] is the association to which many of the project partners belong and which provides a forum for the dissemination of project outcomes at its annual conference.

The PRAXIS Project [16] is an EU funded network project focussing on Projects and Internships. Of specific relevance here is the support for students with disabilities who wish to undertake projects and/or internships. Disabilities are not a focus of the PRAXIS Project so the SALEIE Project can enrich the PRAXIS Project in that respect. In turn, the PRAXIS Project has addressed the skills needs, in particular the generic skills, of projects and internships and laid a general foundation for the generic skills appropriate to technical programmes. This will provide a good basis for the generic skills layer of the programmes dedicated to the key global technical challenges being explored in this project.

Initial discussions are also taking place with a number of other associations and projects have specific relevance to the widening participation and disabilities work.

4.3 Collaborators

Collaborating associate partners are usually technical conference organising bodies at which project partners are presenting or where a special session is being arranged for the dissemination of project outcomes. The benefits gained are, for the

conference body, a wider dissemination of their call for papers and for the SALEIE project, a wider dissemination of both the existence of the project and the presentation of one or more papers. The collaborating partners are currently the EAEEIE, ITHET and the ERASUMS Congress and Exhibition.

5. Plans for the Future

The results obtained to date have allowed us to define the key ways in which the main themes link. Figure 3 shows the refined model. The narrative that follows describes the main activities that will be undertaken in the next phase of the project.

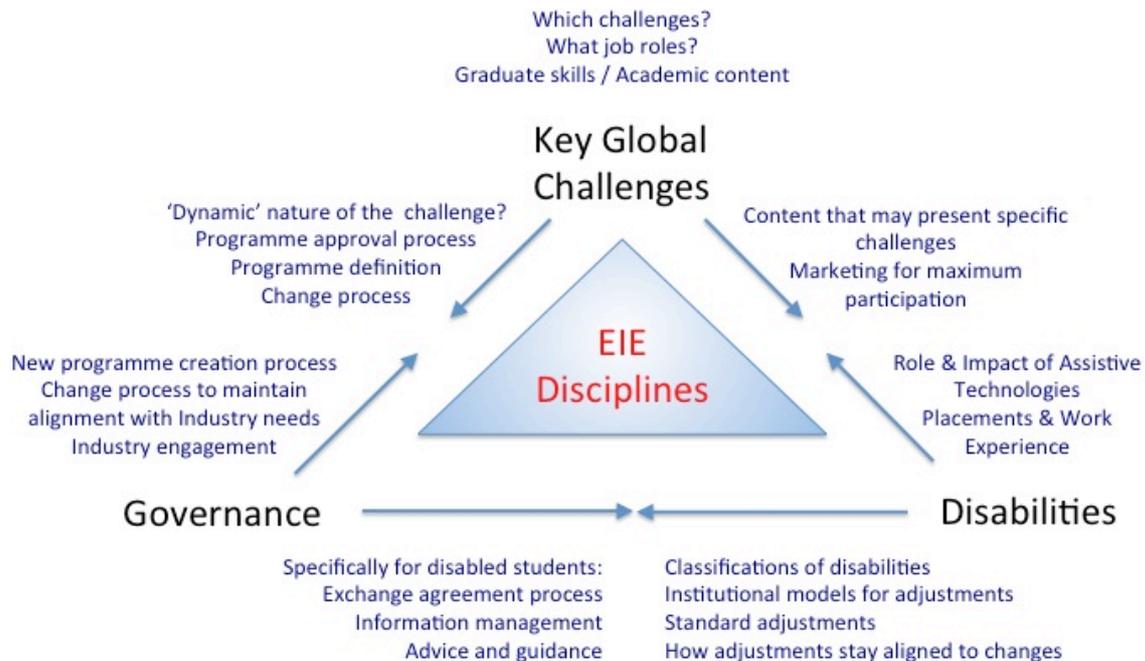


Figure 3. SALEIE Project Workpackages and Linkages between the Main Themes

5.1 Key Challenges

We, Higher Education across Europe, need academic programmes, and hence graduates, to fill jobs that industry needs now and into the future. For each global challenge area there are current employers and there is research into future activities – both of these inform the types of jobs, i.e. the job profiles that are needed. Both of these are sources of information about the required abilities and attributes of graduates. The specific technical challenge areas the project will focus on in its second half are ICT (Network security) and Renewable Energies.

The immediate plans for this workpackage are to explore through existing programme providers and existing industrial networks:

- What job roles do you have now in each area?
- What do you look for in terms of graduate attributes for this/these jobs?
- What technical topics would you expect a graduate to have studied?
- How 'dynamic' is the technical challenge area technically?

- How should the programme be specified, what information and how much detail is needed by the Higher Education Institution and by the employer?

This will enable us to derived models for the content of suitable programmes? This will lead to the definition of graduate attributes, programme Learning Objectives, and the technical content and modules. This in turn will enable us to explore appropriate teaching, laboratory, assessment and delivery models.

In designing programmes we need to ensure there are no fundamental block to any student taking any of the programmes proposed, that the student experience is a positive one, we build student resilience and we create truly “employment ready” graduates. We also need to understanding how Institutions market their programmes to be attractive to ALL potential students. These are the key linkages from the Technical challenges workpackage to the Widening participation and disabilities workpackage.

5.2 Widening Participation and Disabilities

Building on the survey results we plan to encapsulate the findings into a user friendly Student Support Centre webportal. In addition, the following will be specifically explored across the project partners and our wider network:

1. Adjustments – what ‘standard’ adjustments do we have, where we have them, for disabilities in our types ontology.
2. Impact of assessment method on student disabilities – are students with disabilities in our types ontologies affected differently by different assessment methods?
3. How does an institution ensure its standard adjustments remain ‘good’ as assistive technology, disability diagnosis and sociological changes evolve?
4. What Assistive Technologies are available and what is their impact on Teaching and Learning, especially in Laboratory activities?
5. What advice and guidance is available for students, higher education institution staff and employers for students with disabilities who want to undertake an industrial placement or work experience?

5.3 Policy Governance

Building on the survey results the project team plans to explore five important areas of the governance of academic programmes:

1. Programme creation - How easy it is for an institution to create a new programme and who approves it are critical questions for the ability of the institution to respond to market needs for graduates.
2. Programme change - Equally, the ability of an institution to change its programmes and/or modules is important as far as responsiveness to changes in the graduate market demand. We already have some information about practices that can provide us with models of the different change processes, these will be documented as example case studies.
3. Partnerships with other academic institutions - ERASMUS, and now ERASMUS Plus are the obvious partnerships between European partner institutions but they are not the only collaborative models. An understand of the breadth of collaborative models and the forms of agreements that already

exist could provide partners with new ways of producing graduates that meet their local industry needs, especially in our key technical challenge areas.

4. Student placements - ERASMUS exchanges are well established. Within this, and specifically for disabled students there are opportunities for us to add value to the Higher Education community. Such as:
 - Providing guidelines for advice to academics when students approach them about placements or exchanges.
 - Providing guidelines and advice for disabled students who want to go on a placement.
 - Identifying the key information that should flow between the student's home institution and the one they are going to do a placement in. This should include a meaningful transcript and information about the student's disability and adjustments they may need.
5. Engagement with industry - What are the different models of engaging with industry to understand their graduate needs into the future? Here again we already have some information from the survey and could capture examples of, for example:
 - Terms of reference for Industrial Advisory Boards
 - Terms of reference for Industry Liaison Officers

5.4 Extending our Associate Partner Network

Effort will be directed to extending our Associate Partner Network to enhance the dissemination of project outcomes using connected networks including the EAEEIE, IGIP, the IEEE Education Society and partner networks that have connections both inside and outside Europe.

6. Contribution to EU policies

The work being undertaken by the project team has already identified areas where there is a lack of consistency across the partner institutions. This lack of consistency has potential disadvantages as far as responsiveness to market demand for appropriately skilled graduates and for access by all to the academic programmes. The following is a summary of potential contributions to EU policy identified so far. They are all in the early stages of definition but will be developed as the project progresses.

6.1 Technical challenges

No shared approach to job profiles or programme graduate attributes within the EIE field across Europe has yet been identified. Such a facility could be beneficial to Europe's responsiveness as a trading community to global competition in the technical challenges areas.

Practices in terms of programme specification, definition of learning outcomes and mapping of module Learning Objectives to Programme Learning Objectives appears to be variable across the partnership. The benefits of greater harmony in the approach taken will be discussed as a potential for proposal for EU policy consideration.

6.2 Widening Participation and Disabilities

The challenge often faced by institutions involved in student exchanges (especially outside ERASMUS agreements) is knowing sufficient about the modules to make a quality decision on preparedness and fitness to continue upon return. Approaches to improving the information exchange could lead to policy recommendations.

The project could also reveal approaches to marketing EIE programmes, especially to disabled students that all Higher Education Institutions could benefit from.

6.3 Governance of EIE Programmes

The differing approaches to programme design, approval and change management has been shown to be variable across the project partners with some reporting significant external to the institution constraints. These processes have a direct bearing on the ability of the institution to respond to market needs and, given the fast moving technology involved in the key global challenges, programme flexibility is important. The different institutional models will be used to make recommendations on those more appropriate to EIE programme needs.

The approach taken to seeking and using industry advice on programmes is also variable across the project partners. Here again the range of models will be used to propose policy changes towards a more engaging approach.

7. References

- [1] "Report on existing programmes orientated to the key global challenges." SALEIE Project Report. Main contributors: Marian Poboroniuc (Romania), Anthony Ward (UK), Nina Bencheva (Bulgaria), Gheorghe Livint (Romania), Noel Jackson (UK), Ernest Cachia (Malta), Antoanela Naaji (Romania), Dimitar Dimitrov (Bulgaria), Yoana Ruseva (Bulgaria), Dorin Popescu (Romania), Dorian Cojocaru (Romania), Laura Grindei (Romania), Gert Jervan (Estonia), Jean-Marc Thiriet (France). <Date>
- [2] "SALEIE – WP3 Global Challenges Survey", Available from the project website
- [3] "WP3 Report on Survey n=39"
- [4] "SALEIE – WP4 Policy Survey", Available from the project website
- [5] "SALEIE – WP5 Widening Participation and Disabilities Survey", Available from the project website
- [6] Project website <http://www.saleie.co.uk>
- [7] Project infosheet
- [8] EU funded projects at the University of Ruse "Angel Kanchev" in 2013 Project Dissemination Day, 5th November 2013, University of Ruse, Bulgaria.
- [9] "Strategic Alignment of Electrical and Information Engineering in European Higher Education Institutions – Erasmus Network Project", Anthony Ward, Nina Bencheva, Yoana Ruseva, Annual Scientific Conference of University of Ruse and Union of Scientists -Ruse, 25-26 October 2013, Ruse, Bulgaria.
- [10] "Preliminary findings to design EIE curriculum harmonised to the technical global challenges." Poboroniuc, M.S., Cojocaru, D., Livint, G., Ward, A., Cachia, E., Bencheva, N. 24th EAEEIE Annual Conference on Innovation in Electrical and Information Engineering. Chania, Crete, 30th – 31st May 2013.
- [11] "Designing the next generation of virtual learning environments – Virtual laboratory with remote access to real telecommunication devices", Hristov, G., Zahariev, P., Bencheva, N., Ivanov, I., EAEEIE Annual Conference on Innovation in Electrical and Information Engineering. Chania, Crete, 30th – 31st May 2013
- [12] "ICT convergence challenges in Education and their impact on both instructors and students.", Zahariev, P., Bencheva, N., Hristov, G., Ruseva, Y., EAEEIE Annual Conference on Innovation in Electrical and Information Engineering. Chania, Crete, 30th – 31st May 2013
- [13] "How well are we meeting the educational expectations of EIE students?" Ward, A.E., Proceedings of the IETEC' 13 Conference, Ho Chi Minh City, Vietnam, November 3-6, 2013
- [14] "Building a shared understanding of the skills and competences in order to respond to the current global technical challenges", Friesel, A., Ward, A., Mrozek, Z., Poboroniuc, M., Welzer, T. – Submitted to IEEE EDUCON 2014, Istanbul, Turkey 3-5 April 2014.
- [15] European Association for Education in Electrical and Information Engineering (EAEEIE) website. <http://www.eaeeie.org>

[16] PRAXIS Project website <http://www.praxisnetwork.eu>

