A PROJECT BY THOMAS MORE, KU LEUVEN, UPORTO, THE HAGUE UAS, UNIVERSITY WEST AND RVO-SOCIETY

D7.1 Description of the (postgraduate) curriculum

Community Service Engineering

Lifelong Learning Programme

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PREFACE

Community Service Engineering can be defined as the engineering of products, product-service combinations or services that fulfil well-being and health needs in the social domain, specifically for vulnerable groups in society.

The vulnerable groups in society are growing, while fewer people work in care. In the EU policies and social institutional structures are directed towards self-sufficiency and longer independence of the population, including these vulnerable groups. Finding solutions for the unmet needs this creates is the territory of the Community Service Engineer.

Two frames picture the role of engineers in the social domain. After inventing the wheel and making major contributions to the development of almost every sector in industry, time has come for the societal role engineering: Community Service Engineering. Engineers can favour social and warm innovation. Their findings can contribute to the independent life and participation of vulnerable groups in society or to allow organisations in the social domain to keep pace with the rapid technological and scientific evolutions our society is subject to.

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1. INTRODUCTION

This document gives an overview of the Community Service Engineering Curriculum that has been developed by 4 partner countries. All participants start from real-life project work with technology students (EQF level 6 or 7) in the context of Community Service Engineering.

All partners underpin this project work with a taught programme and the mentoring of the students. All students create an online portfolio in which they illustrate both the process and the final result of their project.

On the one hand partners have agreed on common topics and learning outcomes for the taught programme and on a shared approach for project work based on the user centred design cycle. On the other hand the curriculum and collaboration between partners is dynamic and in constant evolution.

CDIO was chosen as the common framework and the syllabus 2.0 was used as a blueprint in each university.

1.1 THE COMMUNITY SERVICE ENGINEERING PROJECT

This document was developed within the CSE (Community Service Engineering) project, a three year European project (2013-2016), co-funded by the European Commission within the Lifelong Learning Programme 2013-2016. The CSE partnership was made up of five higher education institutions: Thomas More (B), who coordinated the project; KU Leuven (B), the University of Porto (P), the Hague University of Applied Sciences (NL) and University West (S). The project used a lot of knowhow of RVO-Society (B), also a full partner in the project. The project also had various associated partners from the field of work in the different countries.

The aim of CSE was to develop a joint CSE curriculum which is now presented here. In order to obtain this result, the members of the project carried out a three year research and development plan which included:

- An initial phase aimed at setting up basic course contents and a learning framework via which different stakeholders could meet and learn

- A next phase focussing on important aspects to be explored and agreed upon for the (international) cooperation between partners/project work. This phase included learning and agreeing on how to detect technological needs in the social domain and how to formulate project proposals for students. It also searched for a good way of communicating with companies seeking to do business in the social domain. In this phase we also discussed about a model for a shared projects back office. Furthermore

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we looked at ways to stimulate students to develop intercultural compentencies while doing project work in this context and collaborating with fellow students across country borders. All this can be looked at as preparatory work for the realisation of curriculum.

- In a next phase all partner countries started up pilot projects with students in the CSE domain. In this phase the taught programme was piloted mainly in Belgium. Virtual and physical mobility between students and teachers was set up in try outs. Special attention was given to define the role of the teacher in the whole.

- In a final phase the curriculum was fine-tuned and agreements were made to maintain this collaboration and expand it to other partners both in and outside of Europe.

1.2 ORIENTATIONS

The development of the curriculum started from experiences with project work by engineering students striving to win a Cera Award; organised by RVO-Society (B). For more than ten years, Cera, a Belgian social cooperative, has been supporting Corporate Social Responsibility projects by encouraging and offering incentives to students to take on challenges of various kinds in society and come up with engineering solutions in fulfilment of their academic requirements.

This project work was typically done for organisations in the social domain (care centres for the elderly, organisations that support people with disabilities and at-risk populations; youth organisations, community services, social welfare organisations, etc.), servicing vulnerable groups in society.

Very often the technological project results did not meet the expectations. The reasons were obvious. The engineering students did not only need to draw upon their technological skills. They also needed a lot of time to understand the target audience and context. There appeared to be no training that could help them. Because of this gap in the educational structure, we started developing a curriculum that could give the necessary background.
The CSE curriculum will allow students to develop user-centered design skills, gain empathy for vulnerable groups and learn about organisations in the social domain in order to develop apt technological end results that can sustain in the market.

We feel the curriculum will attract two different types of students. The first type will choose the programme for what it is initially designed for, i.e. becoming an engineer because they see a problem in the social world and want to fix it. The second type will choose this option in engineering because he/she feels the desire to be well-rounded and is looking to strengthen his/her skills as an engineer and graduate with a unique perspective.

The ultimate goal is to train not only technically excellent but also well-rounded and socially aware engineers.

Community Service CSE Engineering

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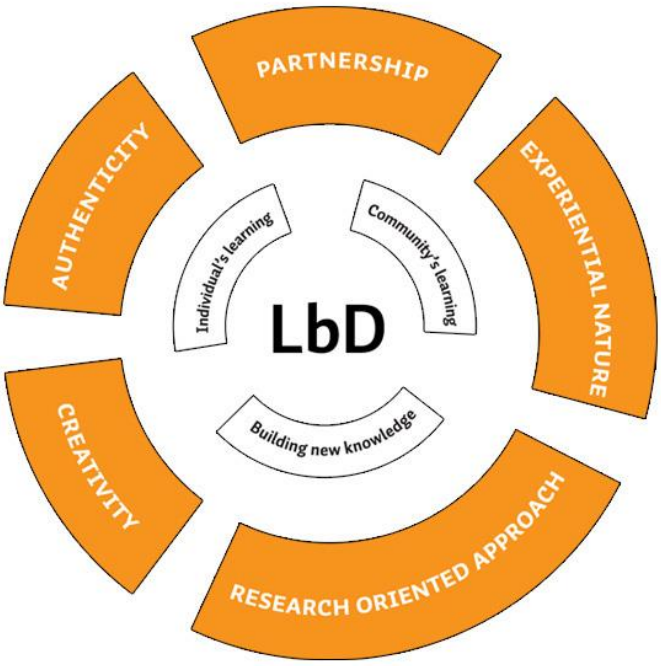
1.3 METHODOLOGICAL APPROACH



CSE fosters the learning by development cycle.

(Creativity) Students are stimulated to choose their own context of work, to have an open mind, get to know the context and detect the potential for innovation and to come up with creative solutions.
(Authenticity) Students choose a real life project and work on it during the entire curriculum.
(Research Oriented Approach) Students are stimulated to find relevant literature to the challenge they are undertaking. They are asked to make reference to a web lectures, video, paper, article that they found themselves.
(Partnership) To come up with a good solution for the real life project, students have to partner up and interact with various partners in the field.
(Experiential Nature) Finally, project work and iteration of versions/prototypes entail active experimentation in that they require students to produce something (a model or prototype, the refinement of existing technology, changes or services to lower the thresholds for the use of existing technology, the design of systems or infrastructure (accessibility and system design within a social profit organisations, etc.).
(Individual's learning) Students start from their own interest and motivation both in regard to project work as in regard to undertaking the project individually or in group. Adult learners have often time constraints to choose for group work.
(Community learning) For all stages, a variety of materials and procedures have been chosen to ensure a rich and motivating learning experience. Moreover, peer learning is constantly fostered through sessions of interaction both on a local and international basis, with new insights feeding into the project work. This is made possible via the CSE international project's database, Feedback fruits as a learning platform and the designers workbook as a blueprint for the project work.

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(Building new knowledge) At the final stage students are invited to tell the narrative of their project and emphasise both the technical end result as well as the process to get there. Students are invited to submit papers with relevant conferences and scientific journals as well as they are invited to inform stakeholders (businesses and other organisations) about their work.

1.4 THE CURRICULUM: PROJECT BASED COURSEWORK (MODULE 1)

The taught programme (cf. infra) underpins the project based course coursework which is central in the CSE curriculum.

Project work is seen as an opportunity to undertake a challenge for the public and in the context students choose for themselves (out of the variety of audiences and organisations in the social domain). The context and options are visualised by two frames. Partners present their project proposals in a shared web application for students to choose from. The engineers can undertake a project individually or in team.

In this educational activity focus is placed on the technical component. Students are expected to deliver
an end result according to the descriptions in the project proposal. These may be:

- A model or prototype
- The refinement of existing technology
- Changes or services to lower the thresholds for the use of existing technology
- The design of systems or infrastructure (accessibility and system design within a social profit
- organisations)
- ...

Students can also propose their own project idea which will be evaluated according to the CSE criteria. These are:

1. It fits within the context of Community Service Engineering: technology that either directly benefits a "vulnerable group" in society or technology strengthening an organisation servicing such a “vulnerable group” (2 frames).

2. The proposal allows frequent interaction with representatives of an organisation in the social domain and/or end users for technology since in the curriculum interaction with various stakeholders while developing the technical end result is of key importance.

The engineers work independently towards their technical end results. They are appointed a coach from the university with a relevant technical background and a promotor from the field of work.

The technical advancement of the project work is supported by the second educational activity in the project based course unit, namely assignments based upon the user centred design cycle. These assignments are presented via a template partners share. This template (and assignments) are a tool to equip students in designing for the social domain and documenting their process in an online portfolio. This online portfolio will be the engineers’ resource to build their narrative of the project and present the final end result.

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All partners underpin this project work with a taught programme and the mentoring of the students. All students create an online portfolio in which they illustrate both the process and the final result of their project.

From the start partners valued virtual and physical mobility between students and teachers to improve project results and learning opportunities. Collaborations and interactions are embedded in the process. They have meaning and create real added value thanks to the real-life project work as core element in each partner institution.

It's a given fact that project's end results often promise market potential in niche markets. The local markets are too small for sustainable business models. That's why partners look for international cooperation with other Higher Education Institutions who share the curriculums mission and vision and who are open to student exchange and collaboration on projects.

1.5 THE CURRICULUM: THE TAUGHT PROGRAMME

1.5.1 USER CENTRED DESIGN & VULNERABLE GROUPS (MODULE 2)

In this module the CSE engineer learns to design for vulnerable groups.

Too often, products, product-service combinations or services are designed with a focus on business goals, fancy features, and the technological capabilities of hardware or software tools. All of these approaches omit the most important part of the process – the end user. User Centred Design (UCD) is the process of designing from the perspective of how it will be understood and used by a human user. Rather than requiring users to adapt their attitudes and behaviours in order to learn and use a product or service, a design can support its intended users' existing beliefs, attitudes, and behaviours. We also touch the differences between User Centred Design, Participatory Design and Inclusive Design.

The CSE engineer will furthermore not design for 'a standard end user' but for a vulnerable group in society or for an organisation in the social domain servicing such a group. We pay attention to informal caretakers, an often forgotten vulnerable group.

Designing for vulnerable groups brings along additional challenges to understand the capabilities and thresholds of e.g. people with a disability, people in poverty, people with a different migration background,…

In this first module the CSE engineers meet the challenges of various vulnerable groups in society. They meet experts by experience who tell their stories and explain what role technology plays in it. Often, they can also tell what 'poorly developed technology' is. Then they mean tools that have been developed with the best intentions, but which do not meet their needs.

The engineers also learn about the concept of 'appreciative inquiry' and gain insight into terms such empowerment, participation and inclusion.

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Communication skills are important in the UCD process and beyond. In this module CSE engineers train skills such as: storytelling, active listening, dialoguing, leading groups in co-creation ...

CSE engineers need to cross many cultural borders. Disciplinary borders because they work at the crossroads of the engineering discipline and the field of social work. Country borders because local markets in the social domain are often too small to valorise the potential of the project work results. Organisational borders while coming in touch with various stakeholders both from the profit and non-profit sector who each have their own culture. Intercultural competences are therefore trained in this module.

1.5.2 ORGANISATIONS IN THE SOCIAL DOMAIN (MODULE 3)

In this module the CSE engineer learns about the context of organisations in the social domain.

The domain is defined. It is put in an international perspective. We touch characteristics of organisations active in the social domain.

This is important because he/she will either work in the domain as an employee or will do business with the sector.

The engineers reflect on questions such as: How much does the public sector cost to a country and what are the returns? How is the sector funded? How difficult is it to manage a social profit organisation and to what extent does it differ from managing a regular business? What are business models for the welfare sector? What is social accounting and social return on investment (SROI)? ...

There are various notions that relate with the domain in which the CSE engineer operates such as social policies, social businesses, social economy, the social profit sector, the not-for-profit sector and NGO's (Non-Governmental Organisations).

In this module we reveal these notions and go into the characteristics of the sector.

The engineers are introduced to various parties, such as government, umbrella and advocacy organisations to get a clear picture of the broad welfare sector. In a strict sense we can divide society into three sectors. Firstly the government or public sector who funds a basic range of services (the welfare state) in areas such as health, education and social welfare with tax revenues. Secondly the NGO sector which exists for public benefit but is privately owned and often depends on gifts or grants for its existence. Thirdly the private or commercial sector where goods and services are produced and traded to make a profit.

Next to this strict classification we learn that there are exceptions to the rule. Organisations active in the welfare sector can be for profit companies. However in most cases they are part of sectors one or two. This causes they exhibit certain common characteristics such as: they have limited resources, are controlled by the government, depend on voluntary work,…

The social domain might have lacked attention from the engineering profession because of these limited resources available in the sector.

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There is a circular dynamic between all three sections. Social wealth creation requires material wealth creation for its existence.

And then, there is another trend: society increasingly expects businesses to assume greater public responsibility. We have entered a new era in corporate innovation and experimentation, when new partnerships and standards emerge, when new, more transparent measures better reflect the full cost of doing business and when greater private participation in the delivery of public goods and services changes companies role in society. A 2010 survey revealed that 87% of nongovernmental organisations (NGO's) and 96% of businesses consider partnerships with each other are important. The growing complexities and magnitude of the economic, social, and environmental problems faced by societies exceed the capacities of individual organisations[1]. Here is a clear link with the topic of corporate social responsibility and corporate social responsiveness which we also consider important in this module.

In this module we present the collaborative value creation framework. Co-creation is a buzzword. User centred design (module 1) and participatory design are closely related. But what exactly does this mean? How do organisations and businesses find linked interests? What is the impact on business models? We provide examples of robust business models in the care sector. We also touch the legal aspects of close collaboration. On this regard, we specifically pay attention to intellectual property and creative commons licences.

1.5.3 TECHNOLOGY IN THE SOCIAL DOMAIN (MODULE 4)

This module takes us back to the question 'What is technology?'. We elaborate on the nature of technology, and the profile of engineering.

We delve into the relationship between science and engineering and ask the question how new technologies arise?

Next the social domain and technology are put in relation to one another. When do people win with technology? The CSE engineers discuss a number of cases and the ethics of technology. We look into the 21 century's grand challenges for engineering and how engineers can make a world of difference. To define technology for the social domain, we make a distinction between technology for vulnerable groups being end users (frame 1) and technology for the social domain being organisations (frame 2).

In this section the engineers study the socio-technical system design, since because of their analytical skills engineers can contribute significantly to the design of organisations.

In this module we treat the sector of assistive technology in detail. We define what assistive technology is. We talk about European actions and actors in assistive technology. We go into the

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history and activities of AAATE (the Association for the Advancement of Assistive Technology in Europe) and show the standards for Assistive Technology.

The CSE engineers study and analyse the accessibility of buildings, public space and accessibility in the wider sense (e.g. regarding ICT). They get to know about the UN Convention on the "Rights of Persons with Disabilities" which states that parties shall monitor the implementation of minimum standards and guidelines for accessibility. We talk about user involvement in standardisation as a rather new phenomenon under the quote "Nothing about us, without us".

We look into how sad is it when the technology that has been developed is not used. What does implementation intelligence mean? How can engineers facilitate acceptance and provide services to ease the commissioning of newly developed technology.

Finally this module taps into the environmental aspects of technology with concepts such as cradle to cradle and circular economy.

2. MODULES: LEARNING OUTCOMES, TOPICS AND RESOURCES

The CSE curriculum consists of 4 modules in total: project based coursework (module 1) underpinned by a taught programme which consist of 3 different modules. The structure of the CSE curriculum is visualised by the figure below.

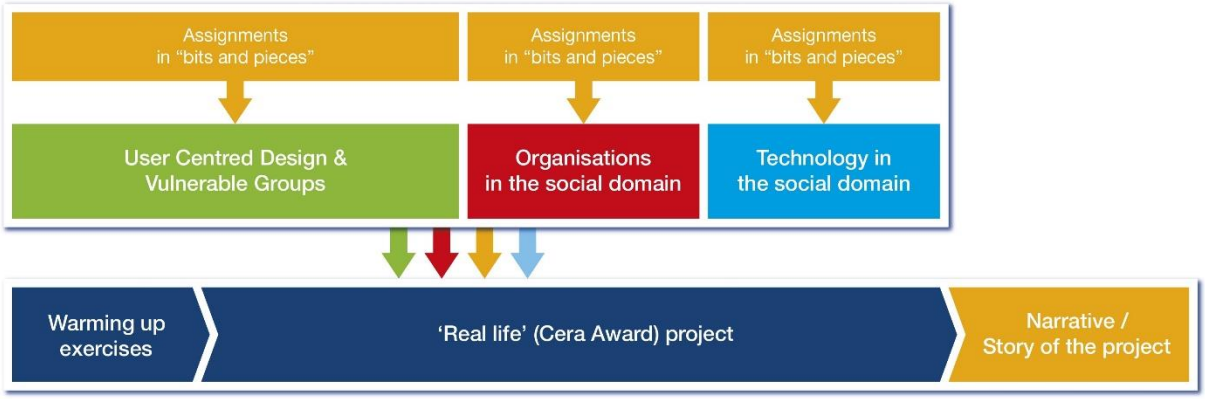

Figure 1: Curriculum Community Service Engineering

The project based coursework is done the context of Community Service Engineering. Partners share a database to identify project ideas, follow up on projects and document the projects end results.

The project based course work as key element is underpinned by the taught programme. The entire curriculum is organised as dynamically as possible. Among the participating higher education institutions, learning outcomes for CSE have been defined based upon the CDIO framework. Minimally institutions offer the course content via the short online track. Many institutions however enrich this content with the resources available on the shared learning platform (Feedback Fruits). In what is next, we sum up the learning outcomes per module. We refer to the minimum content and assignments and link to additional resources.

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2.1 MODULE 1: PROJECT BASED COURSEWORK IN THE CONTEXT OF COMMUNITY SERVICE ENGINEERING

2.1.1 LEARNING OUTCOMES

2.1.1.1 LEARNING OUTCOMES IN BRIEF

- The learner is able to formulate an appropriate technical answer to a 'real need' with a clear link to the social domain.
- He/she can divide the formulated need in a structured way into different sub-problems and address it via the process of the user-centred design cycle in interaction with the end user and other relevant stakeholders.
- In the case a team project is chosen, he/she is able to distribute tasks and to set a schedule in collaboration with the other team members.
- He/she is able to collect additional knowledge if necessary on an independent basis.
- Upon completion of the programme the learner is capable of communicating his/her acquired knowledge and achieved results in a well-structured and clear manner and can demonstrate the possession of interdisciplinary skills thereby utilising advanced information technology.

2.1.1.2 LEARNING OUTCOMES OF THE CDIO FRAMEWORK THAT APPLY TO THIS MODULE

4.3 CONCEIVING, SYSTEMS ENGINEERING AND MANAGEMENT
4.3.1 Understanding Needs and Setting Goals
4.3.2 Defining Function, Concept and Architecture
4.3.3 System Engineering, Modeling and Interfaces
4.3.4 Development Project Management

4.4 DESIGNING
4.4.1 The Design Process
4.4.2 The Design Process Phasing and Approaches
4.4.3 Utilization of Knowledge in Design
4.4.4 Disciplinary Design
4.4.5 Multidisciplinary Design
4.4.6 Design for Sustainability, Safety, Aesthetics, Operability and other Objectives

4.5 IMPLEMENTING
4.5.1 Designing a Sustainable Implementation Process
4.5.2 Hardware Manufacturing Process
4.5.3 Software Implementing Process
4.5.4 Hardware Software Integration
4.5.5 Test, Verification, Validation, and Certification

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4.5.6 Implementation Management

4.6 OPERATING
4.6.1 Designing and Optimizing Sustainable and Safe Operations
4.6.2 Training and Operations
4.6.3 Supporting the System Life Cycle
4.6.4 System Improvement and Evolution
4.6.5 Disposal and Life-End Issues
4.6.6 Operations Management

4.7 LEADING ENGINEERING ENDEAVORS
Creating a Purposeful Vision
4.7.1 Identifying the Issue, Problem or Paradox
4.7.2 Thinking Creatively and Communicating Possibilities
4.7.3 Defining the Solution
4.7.4 Creating New Solution Concepts Delivering on the Vision
4.7.5 Building and Leading an Organization and Extended Organization
4.7.6 Planning and Managing a Project to Completion
4.7.7 Exercising Project/Solution Judgment and Critical Reasoning
4.7.8 Innovation – the Conception, Design and Introduction of New Goods and Services
4.7.9 Invention – the Development of New Devices, Materials or Processes that Enable New Goods and Services
4.7.10 Implementation and Operation – the Creation and Operation of the Goods and Services that will Deliver Value

2.1.2 TOPICS

Project work is possible in two different ways: either a learner selects a project proposal from the pool of
project ideas, either the learner formulates its own proposal that meets the criteria set for project work.

Content wise project work includes the following:

- Warming-up Exercises
- 'Real life' project work according to the learners own choice (individually or team)
- Introduction and motivation
- Description of the 'real life' need with a description of the envisioned final result
- Situating the 'real need' in a broader context; interdisciplinary and international
- Methodology: accountability and project planning/action plan
- Elaboration of the technical outcome on the formulated project proposal
- Bibliography

2.1.3 RESOURCES

- Link to the shared web application for project ideas:

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http://www.cse-projects.eu/

- Link to the template that supports students in undertaking a 'real-life' project for the social domain and that facilitates interaction and collaboration in an international context.

https://sites.google.com/site/designthinking2015/

- Examples of finished projects/good practises

2.2 MODULE 2: USER CENTRED DESIGN & VULNERABLE GROUPS

2.2.1 LEARNING OUTCOMES

2.2.1.1 LEARNING OUTCOMES IN BRIEF

- The learner can adopt the principles of User Centred Design and Participatory Design in precise situations.
- The learner can adopt the principles of Design for all in precise situations.
- The learner can change complex challenges of different vulnerable target groups in the social domain into technological questions.
- The learner can relate with the end user and/or other relevant stakeholders in order to develop solutions and implement them.
- The learner adopts a positive approach towards vulnerable groups in the social domain and addresses the challenges of these groups from the viewpoint of strengths and empowerment.
- The learner can describe the pitfalls of the expert thinking and formulate how to take it into consideration in the process of conceive, design, implement and operate.
- The learner can illustrate how engineering expertise on the one hand and understanding the needs and values of vulnerable groups on the other hand are complementary in the design process.

2.2.1.2 LEARNING OUTCOMES OF THE CDIO FRAMEWORK THAT APPLY TO THIS MODULE

2.2 EXPERIMENTATION, INVESTIGATION AND KNOWLEDGE DISCOVERY
2.2.1 Hypothesis Formulation
2.2.2 Survey of Print and Electronic Literature
2.2.3 Experimental Inquiry
2.2.4 Hypothesis Test and Defense

2.3 SYSTEM THINKING
2.3.1 Thinking Holistically
2.3.2 Emergence and Interactions in Systems
2.3.3 Prioritization and Focus
2.3.4 Trade-offs, Judgment and Balance in Resolution

2.4 ATTITUDES, THOUGHT AND LEARNING
2.4.1 Initiative and the Willingness to Make Decisions in the Face of Uncertainty

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2.4.2 Perseverance, Urgency and Will to Deliver, Resourcefulness and Flexibility
2.4.3 Creative Thinking
2.4.4 Critical Thinking
2.4.5 Self-awareness, Metacognition and Knowledge Integration
2.4.6 Lifelong Learning and Educating
2.4.7 Time and Resource Management

2.5 ETHICS, EQUITY AND OTHER RESPONSIBILITIES
2.5.1 Ethics, Integrity and Social Responsibility
2.5.2 Professional Behavior
2.5.3 Proactive Vision and Intention in Life
2.5.4 Staying Current on the World of Engineering
2.5.5 Equity and Diversity
2.5.6 Trust and Loyalty

3.2 COMMUNICATIONS
3.2.1 Communications Strategy
3.2.2 Communications Structure
3.2.3 Written Communication
3.2.4 Electronic/Multimedia Communication
3.2.5 Graphical Communication
3.2.6 Oral Presentation
3.2.7 Inquiry, Listening and Dialog
3.2.8 Negotiation, Compromise and Conflict Resolution
3.2.9 Advocacy
3.2.10 Establishing Diverse Connections and Networking

3.3 COMMUNICATIONS IN FOREIGN LANGUAGES
3.3.1 Communications in English
3.3.2 Communications in Languages of Regional Nations

2.2.2 TOPICS

- User Centred Design/ Participatory Design/ Inclusive Design
- Vulnerability – Which are the so-called vulnerable groups in society? Knowledge about different disabilities and syndromes. Advocacy organisations for vulnerable groups per country and comparison between countries
- Appreciative Inquiry
- Communication
- Curse of knowledge
- Dialogue
- Storytelling
- Leading groups in cocreation
- Pitching

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- Culture
- Empowerment, participation and inclusion

2.2.3 RESOURCES

- Link to the content of the short online track:

https://www.udemy.com/community_service_engineering/learn/v4/t/lecture/4540642

- Link to additional resources:

https://secure.feedbackfruits.com/#groups/66729/contents/146817

2.2.4 EDUCATIONAL ACTIVITIES/ASSIGNMENTS

Activity 1:

Watch this YouTube video on the curse of knowledge:
https://www.youtube.com/watch?v=tRQnZHxN5z8

Do you think, as an engineer, this curse of knowledge often stands between you and clear communication with an end user? How do you intend to overcome this curse of knowledge in project work? Please write down your reflections in 300 words

Activity 2:

Reflect on the TED Talk from Brené Brown:
http://www.ted.com/talks/brene_brown_listening_to_shame

How do you look at vulnerability? Are there degrees of vulnerability? What about the 'real life' project you have chosen. Is it focussing on empowering a so-called vulnerable group in society? What makes this group a vulnerable group? What are your ideas about empowering this group? If your project is not specifically focussing on a vulnerable group, please imagine a potential vulnerable stakeholder? Will your project's end result be accessible for this stakeholder? How will you strive for an 'inclusive' design'?

Activity 3:

Watch the video on Appreciative Inquiry (David Cooperrider):
https://www.youtube.com/watch?v=3JDfr6KGV-k

Try to reframe the problems, the things that aren't right, the problem statement into an affirmative topic, one that expresses more the wish behind the topic and is inspiring to talk about.

Design a discovery question and a dream/miracle question for your affirmative topic.

Decide via a stakeholdersmap who you want to involve in the conversations.

Activity 4:

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Watch the movie of Yo Tambien (Me too) and reflect upon participation, empowerment, inclusion for the end users or potential vulnerable stakeholders for your 'real life' project. What are pros and cons? Things to consider?

Present your reflection note (300 words)

Activity 5:

Please complete the questionnaire (in Dutch) on intercultural competences, make a screenshot of your result and comment on it. Do you recognise some strengths or weaknesses (eg. Communicative skills, conflict management skills,…)? How can us use your strengths in the design process? How could you improve your weaker points?

You obtain a personal login and password.

You obtain a new login and password at the end of the course. Via this second login you can check whether you have evolved in your intercultural competence.

2.3 MODULE 3: ORGANISATIONS IN THE SOCIAL DOMAIN

2.3.1 LEARNING OUTCOMES

2.3.1.1 LEARNING OUTCOMES IN BRIEF

- The learner can define terms such as social policies, social business, social economy, the social profit sector, the not-for-profit sector and sum up characteristics of organisations active in the social domain.
- The learner can categorise organisations in the social domain in an accurate way and clarify their position in society using a social road map and compare between countries.
- The learner can describe trends in the social domain and compare between countries.
- The learner can translate the challenges of organisations in the social profit sector into technological
- questions.
- The learner can address challenges concerning processes, management, financing and economic structures of social profit organisations in a solution-directed way in concrete situations.
- The learner can explain the concept of corporate social responsibility and give examples of linked interests between organisations in the social domain and businesses.
- The learner can apply the principles of open innovation and explain intellectual property issues.
- The learner can show directions from a project's end result towards valorisation, implementation and operation in the social domain.
- The learner can illustrate and substantiate the societal added value of organisations in the social domain.

2.3.1.2 LEARNING OUTCOMES OF THE CDIO FRAMEWORK THAT APPLY TO THIS MODULE

4.2 ENTERPRISE AND BUSINESS CONTEXT

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4.2.1 Appreciating Different Enterprise Cultures
4.2.2 Enterprise Stakeholders, Strategy and Goals
4.2.3 Technical Entrepreneurship
4.2.4 Working in Organizations
4.2.5 Working in International Organizations

4.8 ENTREPRENEURSHIP
4.8.2 Business Plan Development
4.8.3 Company Capitalization and Finances
4.8.6 The Innovation System, Networks, Infrastructure and Services
4.8.8 Managing Intellectual Property

2.3.2 TOPICS

- Trends in the social domain
- Subsectors in the Care/Welfare and Social Work domain - Social Roadmap
- Social Innovation
- Economic valorisation:
    - Business models
    - The cooperative form
    - International cooperation
    - Open innovation
    - SROI – Social Return On Investment
- Legal Aspects

2.3.3 RESOURCES

- Link to the content of the short online track:

https://www.udemy.com/community_service_engineering/learn/v4/t/lecture/5208160

- Link to additional resources:

https://secure.feedbackfruits.com/#groups/66729/contents/146821

2.3.4 EDUCATIONAL ACTIVITIES/ASSIGNMENTS

Activity 1:

Have an interview with the director (or a person with decision power) of the organisations related to your projects. Ask questions such as: What is your role as an organisation in society? How do you fulfil this role? What are evolutions you see in the sector? Are these evolutions for the benefit of your clients? ... Draw up a small report (600 words)

Activity 2:

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Carry out a constraint field survey of the specific organisations related to your projects on a micro, meso and macro level. What are neighbouring sectors?

What about other countries? Compare to at least one other country? Are their similar organisations, is there a similar sector?

Activity 3:

Conduct a brief organisational analysis of the organisation that you are carrying out the project for. In case you are not working directly with an organisation, conduct this analysis for an organisation that could be servicing your end-user. This analysis could be based on the 7-S Model - Mc Kinsey; we provide a document that could be used for this task.

Activity 4:

Which stakeholders could be interested in your solution? Would a cross-sector collaboration be important to further develop this solution? With whom (different stakeholders) could you set up a long-term partnership? What would be the added value of collaboration with these stakeholders? What has to be agreed upon? – Open discussion via Webex for each of the projects. You could invite stakeholders to these online discussions.

You can find inspiration in the book "Creating Value in Nonprofit-Business Collaborations: New Thinking and Practice", Wiley, Hardcover – April 2014 by James E. Austin and M. May Seitanidi. We provide a worksheet to get you started.

Activity 5:

Watch this video on the Creative Commons Licences - https://www.youtube.com/watch?v=AWxyx5iYdvI

Watch this video on circular economy:

https://www.youtube.com/watch?v=TtR1ibE8Zt0

While developing have you taken into account legal and environmental issues? Please share your experiences on that regard in a WIKI. Make a distinction between legal and environmental issues.

2.4 MODULE 4: TECHNOLOGY IN THE SOCIAL DOMAIN

2.4.1 LEARNING OUTCOMES

2.4.1.1 LEARNING OUTCOMES IN BRIEF

- The learner can illustrate how technology can contribute to the empowerment of vulnerable groups in the social domain.
- The learner can illustrate how technology reinforcing social profit organisations can help to optimise these organisations.
- The learner can adopt the principles of accessibility in the social domain in precise situations.
- The learner can adopt the principles of User Centred Design and Participatory Design in precise
- situations.

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- The learner can adopt the principles of Inclusive Design in precise situations.
- The learner can adopt the principles of Socio-technical System Design in precise situations.
- The learner can identify pitfalls for implementation and operation of technology in the social domain
- and formulate solutions to tackle these pitfalls.

2.4.1.2 LEARNING OUTCOMES OF THE CDIO FRAMEWORK THAT APPLY TO THIS MODULE

4.1 EXTERNAL, SOCIETAL, AND ENVIRONMENTAL CONTEXT
4.1.1 Roles and Responsibility of Engineers
4.1.2 The Impact of Engineering on Society and the Environment
4.1.3 Society's Regulation of Engineering
4.1.4 The Historical and Cultural Context
4.1.5 Contemporary Issues and Values
4.1.6 Developing a Global Perspective
4.1.7 Sustainability and the Need for Sustainable Development

2.4.2 TOPICS

- The societal role of engineering and technology
- Deonthology of technology
- Examples of technology for vulnerable groups (frame 1)
- Examples of technology for the social domain (frame 2)
- Assistive Technology, International Organisations and international standards
- Accessible building/accessibility in general
- Socio-technical system design
- Implementation intelligence (acceptance and services to use technology)
- Environmental aspects (cradle-to-cradle) – circular ecomomy

2.4.3 RESOURCES

- Link to the content of the short online track:

https://www.udemy.com/community_service_engineering/learn/v4/t/lecture/4540680

- Link to additional resources:

https://secure.feedbackfruits.com/#groups/66729/contents/146825

2.4.4 EDUCATIONAL ACTIVITIES/ASSIGNMENTS

Activity 1:

Is accessibility an issue in your project? Visualise with a brief photo report or video.

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Activity 2:

Gradually, through experiments, internal and external interactions with fellow students, mentors, promotors and stakeholders the project advances. You adapt your project result to new insights. Through these adaptations, new frames of creation lead to interactive and synergistic values. In this sense, value creation both requires and produces valuable intangibles. How to really have end users participate and how to keep the dialogue ongoing? Is there a difference between projects? Does interaction have added value for your design process and for the end result?

Have a discussion without any format on these questions via the online meeting tool.

Activity 3:

You've almost reached your project's end result. You looked at business models. Now, do you think other businesses could use what you have developed? Contact them and explore interest. At the start of your project: Did you look at existing technology? Could existing technology (maybe used for other purposes) have been an added value for your project's end result? Is an international dimension important for your projects result in order to have chances for long term sustainability? Write down your findings and thoughts in a report (600 words)

3. RECOGNITION

Each partner organises its own evaluation processes.

The recommended way to evaluate a student is on a pass/fail basis. (See D5.2 Procedures and documents for project work). It is advised to have him present his project (technical end result and narrative (process)) in front of a jury that consists of his promotor (representative of a company, social profit organisation, research group), mentor (staff member of the HEI) and an objective third person (this person has not been involved in the process until the moment of evaluation).

All attendees receive a feedback form per student. They are invited to write down their feedback and observed strengths and weaknesses and recommendations. This is input for the jury team per student (promotor, mentor, 3rd person).

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