Real Project – Rural Mobility

SCE Course Material[i]

Academic Term Summer: March – July 2020

About Real Projects

Real Projects is the undergraduate teaching format of Strascheg Center for Entrepreneurship (SCE) and the Munich University of Applied Sciences. The format teaches entrepreneurial thinking and acting through interdisciplinary practical projects. Real Projects offer - for students of all disciplines - access to an excellent entrepreneurship education in theory and practice. Real Projects is a training format for the 'entrepreneurs of tomorrow' - equipped with the skills to help shape the future responsibly.

Projects within this format can include both product and service ideas and aim both for monetary success and social innovation. The prerequisite for a project is its entrepreneurial character. This means that the task is open-ended and can be implemented in an interdisciplinary manner, the project has innovation potential, is relevant to practice, and a viable business concept is developed at the end of the semester.

Project sponsors can be students, professors as well as companies. The SCE is the contact and collection point for the projects and mediates between all participants. Professors from the departments of technology, economics, social sciences and design combine their project seminars and thus lead their interdisciplinary student teams to realizable results within one semester. In addition to the supervising professors and the project sponsor, the student teams are supported by an entrepreneurship coach from the SCE.

At the end of the semester, the results are presented and the further course of action is determined together with the project sponsor.

Who - Target Audience

Real Project courses are designed for bachelor students, usually in the fifth or sixth semester of their studies in all four disciplines of engineering, economics, social studies, and design. Some professors that get engaged in the courses bring in students of master degree programs. Offering our courses to more experienced students relates to our Real Project approach that is more based on experiential learning through teamwork and less on theoretical inputs. While SCE delivers inputs on innovation process methodology and tools specific knowledge and methods of engineering or economics are either provided by the professors or are presumed. A typical Real Project course is taught by one to two professors and one SCE staff member to a combination of up to 50 students depending on the number of students each professor brings into the interdisciplinary courses

How - Pedagogy

It is widely agreed that the best way to teach entrepreneurship is through action-based learning, experiential learning, and problem-based learning pedagogies (e.g. Gorman, et al., 1997; Klandt and Volkmann, 2006). These pedagogies are classified as student-centered constructivist approaches – in contrast to teacher-centric objectivist methods (Brown, 2009).

Traditional teacher-centric methods involving reading, memorization, lectures and tests, are deeply entrenched throughout the EU. While these methods might be appropriate for acquiring knowledge, they are weak at developing skills and competencies (e.g. teamwork, communication, leadership and problem-solving) or attitudes (e.g. self-efficacy and internal locus of control) (Löbler, 2006). Many EU educators thus have been relatively unfamiliar with student-centric teaching pedagogies. There are many ways to add these pedagogies to a degree program such as consulting projects (Solomon et al., 1994), case studies (Katz 1995), student entrepreneurship clubs (Gartner and Vesper, 1994), simulations (Hindel, 2002), role playing (Low, et al., 1994), and business plan writing courses (Carrier, 2005).

Experiential learning is the most intensive of the student-centric teaching approaches (Kolb, 2014; Kolb and Kolb, 2005). The deeper the emotional involvement of the students, the deeper and more transformational the learning can be (Shepherd, 2004). Students should care about their own learning, so Real Projects are designed to allow wide student choice and the ability to make an impact on society and achieve student values. Thus, Real Projects must be flexible to allow students to make a value connection with their projects and team members to accomplish more than they could on their own.

Learn online via DeepDive Entrepreneurship MOOC

In 2018, SCE started to develop a MOOC-based school for entrepreneurship: **DeepDive** is a cooperative project created by the Munich University of Applied Sciences (MUAS), 6 Academic Departments and its Entrepreneurship Center - Strascheg Center for Entrepreneurship (SCE). They all joined their strengths and knowledge to offer an innovative, interdisciplinary and international Education Program. The DeepDive MOOC offers two Open Online Courses, which are free of charge for everybody who wants to register:

1. Entrepreneurship and Digital Transformation (https://www.deepdive.school/course?courseid=digital-transformation-and-entrepreneurship), and
2. Introduction in Entrepreneurship (https://www.deepdive.school/course?courseid=entrepreneurship-basics)

'Introduction in Entrepreneurship' (https://www.deepdive.school/course?courseid=entrepreneurship-basics) is the backbone for the Real Projects concept and offers - in 10 practice-oriented and self-reflexive steps – learnings and insights about

1) 'How to become an entrepreneur',
2) 'The power of StartUps',
3) 'The Entrepreneurial Way and Personality',
4) 'How to spot opportunities',
5) 'How to build and maintain a great entrepreneurial team?',
6) 'How to develop your idea using 'Human Centered Design'-Tools',
7) 'Take a look into the Future and design your own future',
8) 'How to build a business model'
9) 'All you need to know about Prototyping'
10) 'How to deal with failure'

Each step integrates insights from teachers and researchers in responsible entrepreneurship, and many practical experiences from startUps and serial entrepreneurs. Each step also is framed with practical tasks and exercises, and with certificate questions leading to acquire a voluntary online certificate of the course. The program is framed by an introductory overview and a detailed self-reflective assessment at the end.

For all students enrolled in a RealProject like 'Rural Mobility', the course 'Introduction in Entrepreneurship' is mandatory. Finishing the online-course is the basis for working on your own entrepreneurial project.

Learning by Doing – Experiential and Transformative Learning

In designing Real Projects, SCE chose to focus on action-based experiential learning through the introduction of interdisciplinary team projects. We wanted the students to be able to experience an entrepreneurial project from idea generation to actually building something and interacting with customers or stakeholders. In addition to entrepreneurship knowledge they train relevant entrepreneurial skills and competences simply by being involved in the project.

SCE defines the innovation process as dynamic including many dimensions that demand a holistic approach from our teaching activities (Sailer et al., 2012). The starting point of any innovation process can be either a new technology, an idea, a problem, or sometimes only a vision to change something. The most critical factor is actually the individual, within the team, and surrounded by various stakeholders. The impact of society is also essential to the success of innovative solutions and needs to be considered. Among various approaches to innovation processes SCE has chosen and combined two prominent methodologies and tools as guidelines, i.e. human-centered design that puts emphasis on the exploration phase and business modelling that asks for sustainability and profitability.

REAL PROJECTS TEACHING APPROACH

- „Action-Based-Learning" (Kolb 1984, Hauser 2008)
  - Learning by experience (Bandura 1982)
- Up-to-date methods and tools
  - Rapid Prototyping, Business Modeling, Effectuation, Design Thinking,
- Project as didactic instrument

Our SCE approach to innovation processes provides structure for both students and teachers alike. This model was heavily influenced by the design thinking methodology (T. Brown, 2009) and also includes elements from effectuation theory (Sarasvathy, 2001) and the Lean Startup movement (Blank, 2013; Ries, 2011). Design thinking is an innovation methodology which encompasses a wide set of tool adapted from the domain of traditional design education, which are made available to wider audience. It trains people in the mindset of creating new things which are desirable from a human-centered point of view (it needs to make people's lives better) with what is economically viable (it needs to have a working business model) and with what is technologically feasible (we need to be able to actually build it) (T. Brown, 2009).
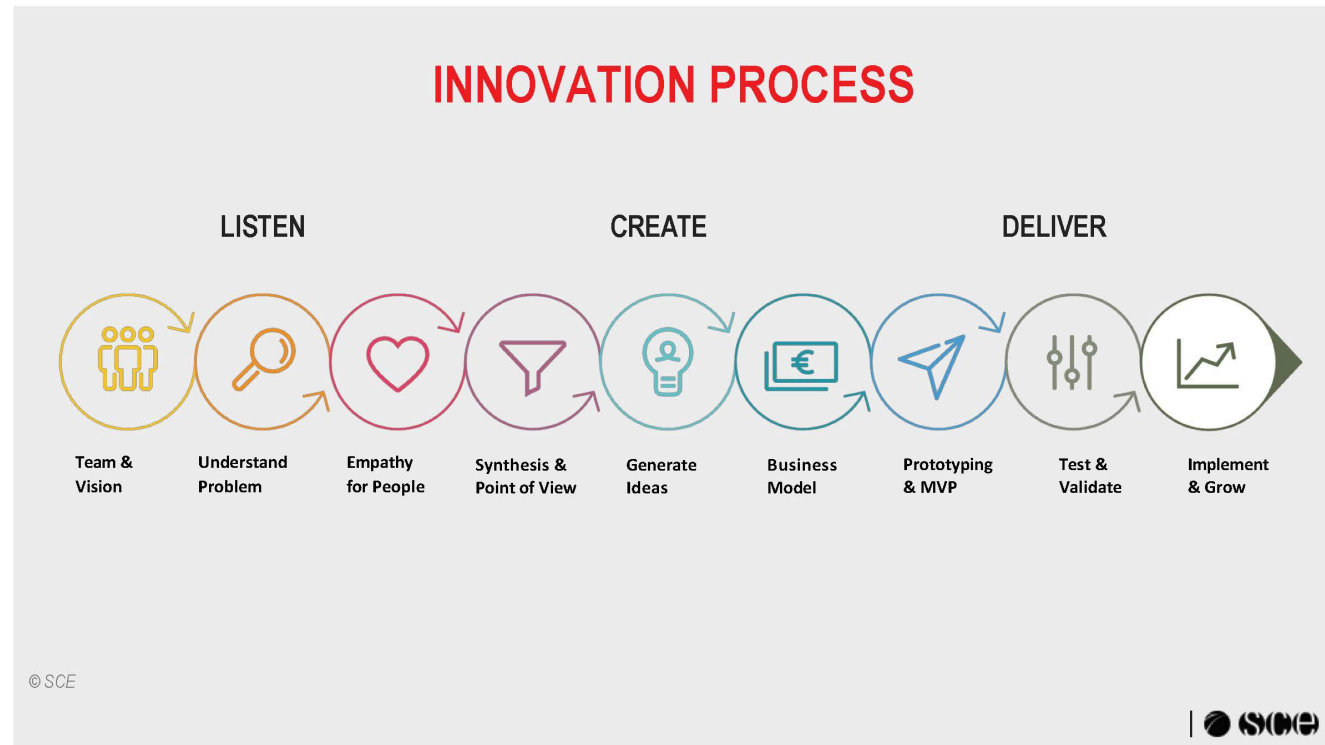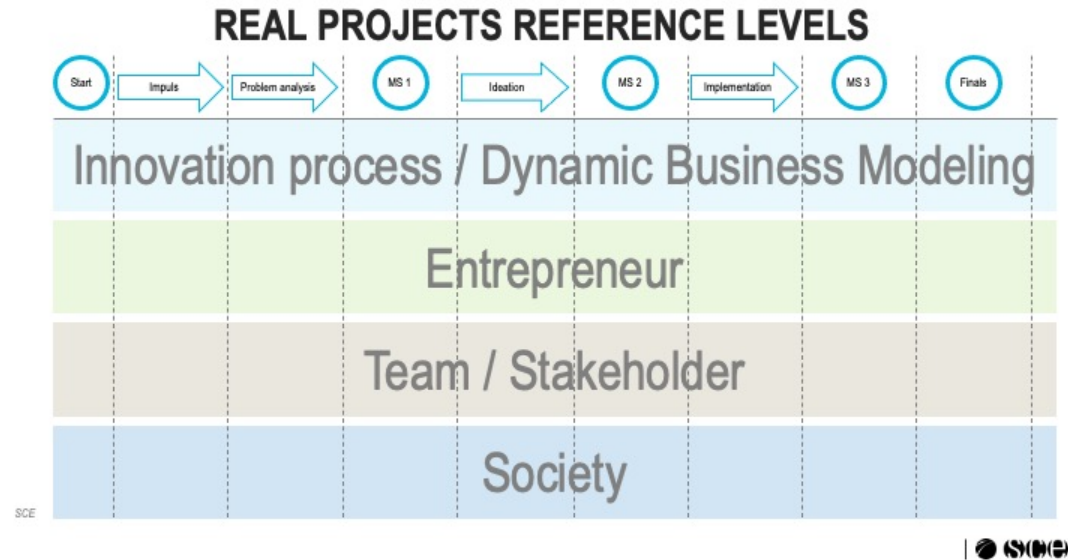
One of the key success factors in applying this holistic and dynamic model is the concept of iteration (Grots & Pratschke, 2009). The phases should not be interpreted as a strictly linear 'recipe for success', but rather as a guideline for structuring each Real Project. It is possible to iterate between different steps to e.g. test an assumption formulated with a quick prototype and business model, and then go back and use new insights from this to adjust the project trajectory. Our process model also provokes the use of different modes of thinking by encouraging students to switch between divergent thinking (i.e. generating options/ideas to choose from) and convergent thinking (i.e. narrowing down choices and creating focus) which is crucial in trying to create

(radically) new concepts or solve complex problems (T. Brown, 2009). Our experience so far suggests that this model lends itself well for structuring multidisciplinary teamwork of students with little prior exposure to similar innovation models (cf. Seidel & Fixson, 2013).

What - Course Description

A Real Project takes place when two or more professors team up for an interdisciplinary course that incorporates entrepreneurial thinking and action. This process is often supported and mediated by the SCE project managers, i.e. they search for professors from complementary faculties bringing in their respective students in order to form teams of engineering, business, social, or design students. While the professors are responsible for their specific technical inputs and the grading of their students, the SCE coaches contribute with innovation and entrepreneurship knowledge, methodology, and tools to the course.

Rural Mobility Course Description

In the Rural 3.0 Project, the Real Project has been launched by two teachers from SCE (Mirko Franck and Klaus Sailer) and the Coordinators from Rural 3.0, Detlef Däke and Wolfgang Stark. The project has been sponsored by the LEADER Project Lake Ammer (Southern Bavaria) and has been prepared with the mayors from the 16 communities representing the LEADER-Project (https://lagammersee.de).
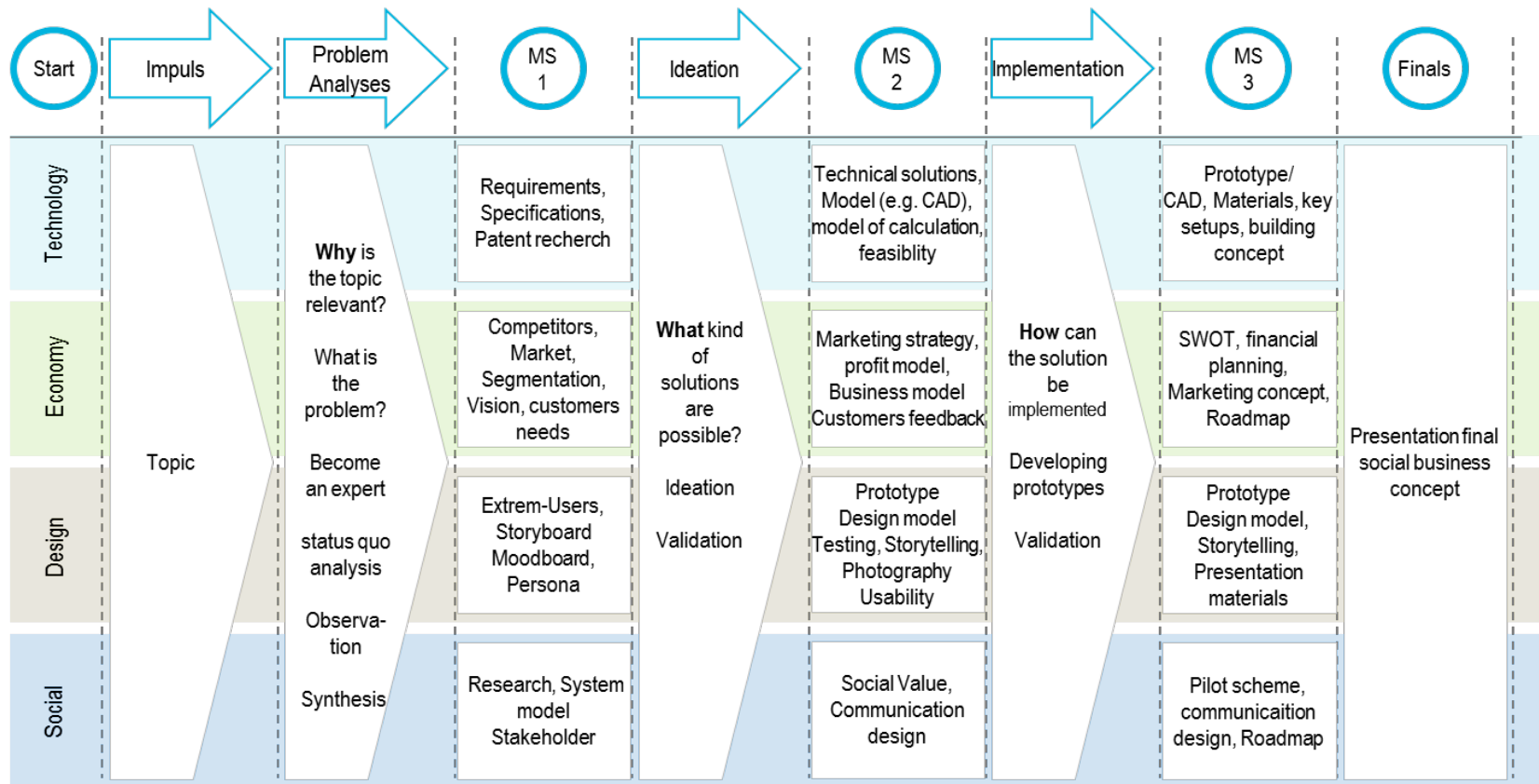
In the *'Real Project on Rural Mobility'*, 18 students from three faculties of the Munich University for Applied Sciences (https://www.hm.edu/en/about_hm/departments/index.en.html) enrolled: Dept of Tourism, Dept of Design and Dept. for Business Administration.

In addition, about 8-10 stakeholders from the Lake Ammer (Ammersee) region participated as experts:

- local entrepreneurs and freelancers
- local politicians and mayors
- tourism managers
- administrators
- environment activists
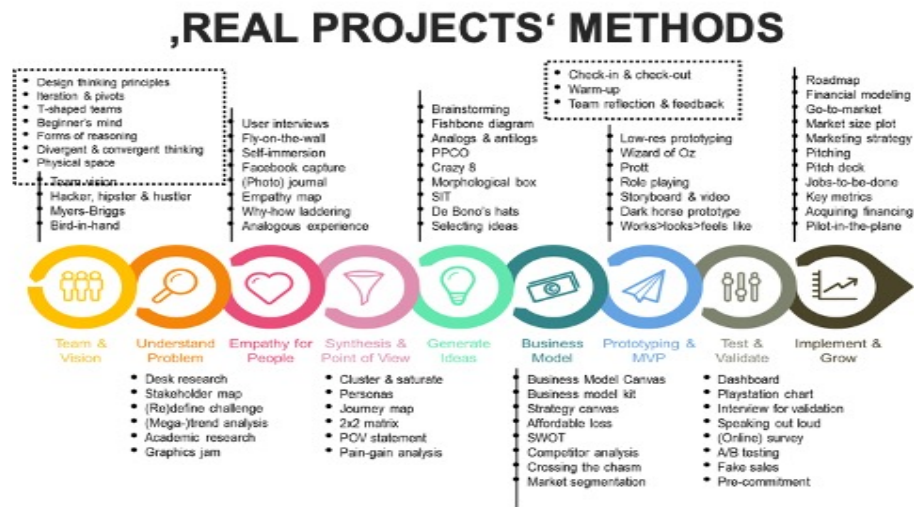
Real Projects Course Structure

The course structure is based on three stages with respective milestones to be presented by the student teams. In most Real Project courses - like in this case - students get a main topic as an impulse.[1] The sponsors (the LEADER community network and the mayors) set the framework for the main topic 'Rural Mobility' based on the local experience and their local political agenda.

	Impuls	Problem Analyses	MS 1	Ideation	MS 2	Implementation	MS 3	Finals
Technology		**Why** is the topic relevant?	Requirements, Specifications, Patent recherch		Technical solutions, Model (e.g. CAD), model of calculation, feasiblity		Prototype/ CAD, Materials, key setups, building concept	
Economy	Topic	What is the problem? Become an expert status quo analysis Observation Synthesis	Competitors, Market, Segmentation, Vision, customers needs	**What** kind of solutions are possible? Ideation Validation	Marketing strategy, profit model, Business model Customers feedback	**How** can the solution be implemented Developing prototypes Validation	SWOT, financial planning, Marketing concept, Roadmap	Presentation final social business concept
Design			Extrem-Users, Storyboard Moodboard, Persona		Prototype Design model Testing, Storytelling, Photography Usability		Prototype Design model, Storytelling, Presentation materials	
Social			Research, System model Stakeholder		Social Value, Communication design		Pilot scheme, communicaition design, Roadmap	

Flow (top): Start → Impuls → Problem Analyses → MS 1 → Ideation → MS 2 → Implementation → MS 3 → Finals

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[1] The topic can be most important for the quality of the results. If it is too general the teams need too long to find an opportunity and therefore the results are not very focused at the end. If the topic is too narrow it restricts creativity and makes it difficult for the student teams to find an "out of the box" solution. In certain courses, giving teams the complete freedom to work on their own independent project ideas has proven to be an efficient and successful approach as well.

- In the first weeks the teams develop a joint understanding of the problem or challenge they want to solve which is leading to a concise problem definition in the first milestone including research on the needs of users, stakeholders, and the market.

- In the next stage of idea generation the teams develop as many ideas or solutions as they can in order to evaluate and then reduce them to one or two. Comparing them in terms of technology development, target groups, strategic partners, competitors, and the business model behind brings student teams to assess feasibility and profitability of the selected ideas. We use varying business models (e.g the Business Model Canvas from Osterwalder, 2010) from literature and practice to illustrate the key components of a successful business that you need to think through to position yourself in the market. Depending on the chosen solutions and the iterative feedback on prototypes and concepts that are collected and incorporated throughout the innovation process, the components do change and get adapted. Thus the second milestone includes (a list of max. 2-3) solutions that had been evaluated by the team pointing out the one that proved worthy to continue.

- In the third stage of our Real Project course the students eventually refine their prototypes and complete the business concept in terms of financial planning, marketing strategy, and strategic roadmapping.
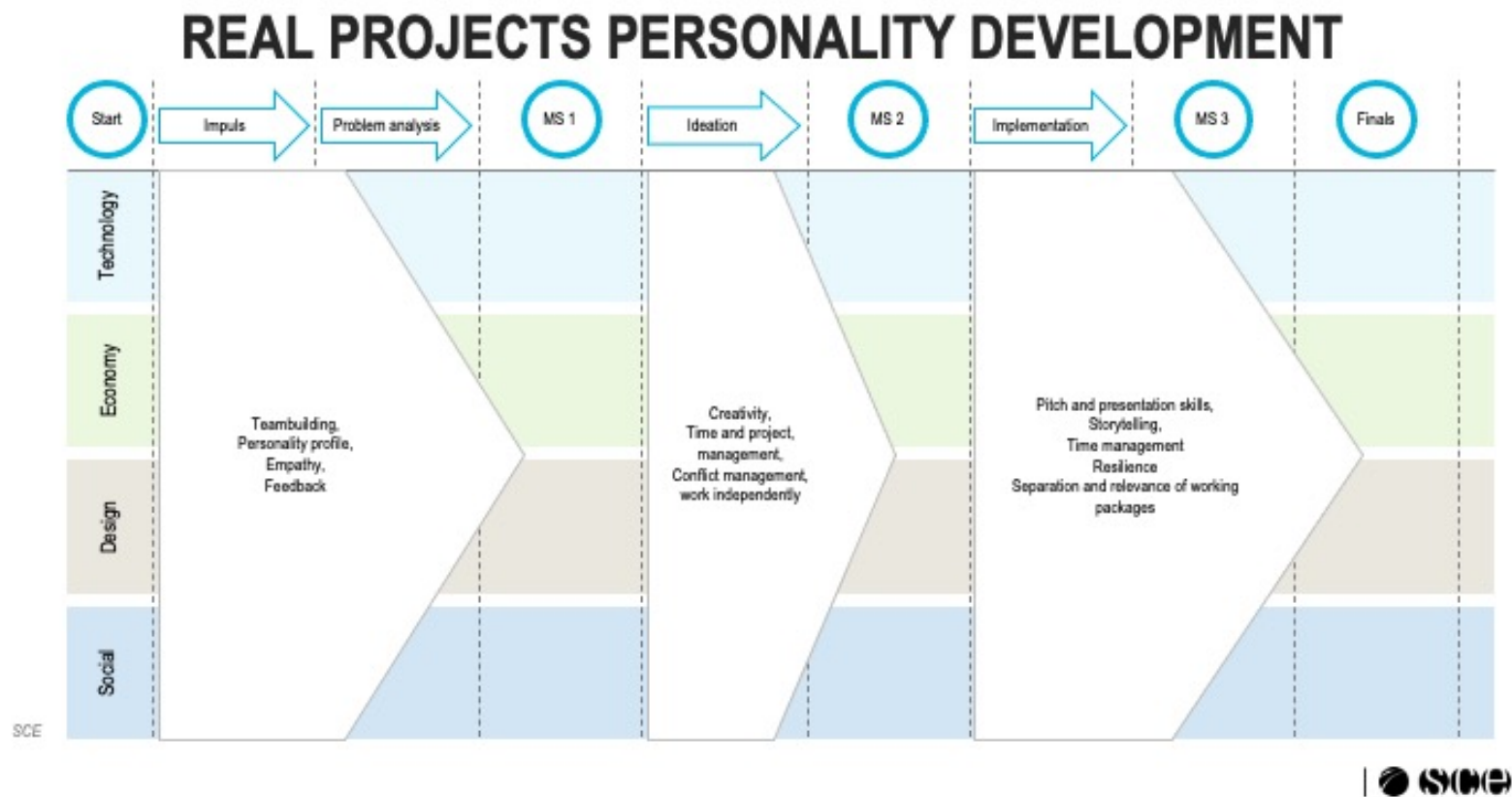
The single courses close with the final presentations of the teams, followed by a joint event of all Real Projects where participating professors and students present their courses and ideas to their fellows. There is a wide range of entrepreneurial education tools offered to be used in Real Projects:

'REAL PROJECTS' METHODS

Team Building

Supporting team development in the beginning is critical to the teamwork process during the course. We normally restrict the team size to 5-6 students, however, one of our most successful Real Projects courses, in terms of continuing with their ideas in the aftermath, has had teams of eight to ten members (please follow special steps for team building in https://www.deepdive.school/course?courseid=entrepreneurship-basics)

Team Building and personal reflection on one´s own role is also an important part of the Real Projects Personality Development towards an entrepreneurial mindset (see below).

Results - Learning Outcomes and Goals

We follow the Best Practices in Entrepreneurship Education Program Objectives presented at the inaugural 3E ECSB Entrepreneurship Education Conference in Aarhus (Gedeon, 2013). These best practices implement the "value add" or "institutional impact" approach that makes student transformation the primary goal of the goal-setting framework (Tam, 2001; McMillan, 1988; Barnett, 1992). Primary goals are thus defined as student learning outcomes (e.g. knowledge, skills and attitudes), secondary goals are input factors that support student transformation (e.g. faculty qualifications, resources and facilities) and tertiary goals are output factors such as number of students, courses, awards, startups, community/society impact and student satisfaction (Gedeon, 2013).

Each professor brings his/her own domain-specific degree program Learning Outcome goals to the course. In addition, each Real Project course is expected to achieve certain overarching Learning Outcomes. In the Real Project courses we are implementing the following educational evaluation measures, based on the Kirkpatrick framework which is the most accepted method (Eseryel, 2002). They include personal growth measures of knowledge, skills, attitudes and satisfaction (Kirkpatrick, 1975).

Knowledge ('Head')
- Domain-Specific knowledge (based on the collaborating faculties)
- Human-centered innovation process methods and tools
- Business Model Canvas

Skills and Competences ('Hand')
- Teamwork
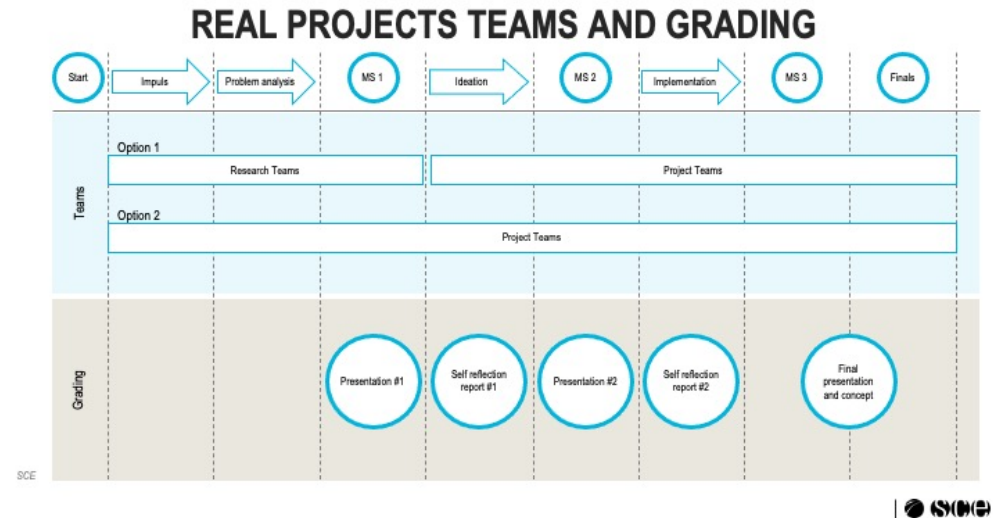- Creativity
- Problem Solving

Attitudes and Mindset ('Heart')
- Core Evaluation, Self Esteem and Internal Locus of Control
- Perceived Self-Efficacy
- Entrepreneurial Mindset
- Entrepreneurial Intentions

Student Satisfaction and Evaluation

As for the Real Project courses we want our students to experience and train skills such as teamwork, empathy, dealing with uncertainty in the first stage of analyzing the problem, followed by competencies such as creativity, management of time, project, and often conflicts. In the last stage of the innovation process, we make students train their presentation skills, storytelling, and resiliency. Based on these learning goals are the requirements for the evaluation of the performance of the students and the grading:

- two presentations during the process following the milestones of the project
- two self-reflection reports, and
- one final presentation of the project and a project concept (see below).

SCE is a founding participant in the ASTEE-program (Assessment Tools and Indicators for Entrepreneurship Education). This project was co-funded by the European Community, the Competitiveness and Innovation Framework Programme (CIP) with the goal to develop measurement tools for assessing entrepreneurial knowledge, skills, attitudes and mindsets (Mober, et al., 2014). The ASTEE assessment tool begins with the EU framework for elements of entrepreneurship education (Heinonen and Poikkijoki, 2006) and thus also includes demographic information, experience, awareness of entrepreneurship as a career path, connectedness to education, and connectedness to future career (Moberg, et. Al., 2014). Since 2018, SCE uses EPIC (https://www.sce.de/en/epic.html), the course assessment tool for 'Entrepreneur Potential and Innovation Competencies (EPIC)', which has been developed together with the OECD and EU Platform 'HEInnovate'. EPIC is available for free online at https://heinnovate.eu/en/heinnovate-resources and can be customized as a science-based evaluation tool for any kind of university-based courses.

SCE is ISO 9001 certified and follows total quality management principles in the delivery of its educational programs (Sun, 2000). There are three potential levels of results we can assess: (1) individual student grades; (2) group-level analysis (by project grade, course grade, by department, drop-out rate, satisfaction…); and/or (3) overall program-level analysis (Baker, 2001).

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