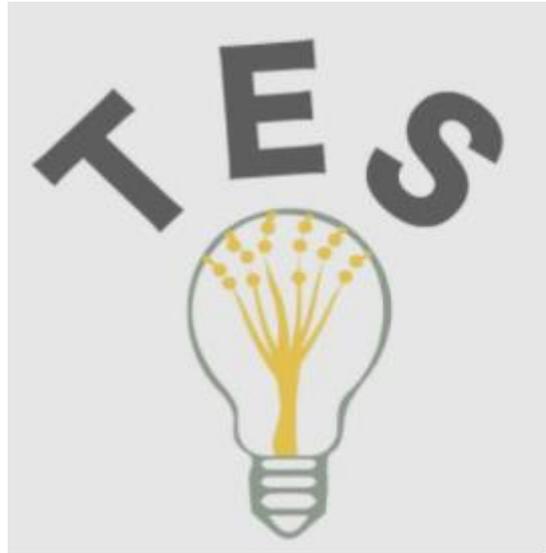


# Teaching Sustainable Entrepreneurship: Teaching Module



TES Project, Intellectual Output 2

Nord University

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# Introduction to Teaching sustainable entrepreneurship

In the following we describe the teaching module developed in the Erasmus+ Strategic partnership project Teaching Entrepreneurship for Sustainability (TES). The module is the main outcome of work package 2 (WP2) and is based on the literature review developed in work package 1 (WP1). How to implement the module in your own teaching is described in the train-the-trainer guidelines developed in work package 3 (WP3). The content of the teaching module including learning activities, tools, and assessment methods for each competence was selected in a workshop for the TES project held in August of 2022<sup>1</sup>. The selected content for the module is based on the knowledge and experience of the participants from their work with sustainability and entrepreneurship in education.

The module description is based on Table 1, where the overall teaching approaches for the module are active learning and collaborative learning. The sustainable entrepreneurship (SE) competences uncovered in the literature review are articulated into learning outcomes and each learning outcome has suggested content, learning activities, tools for learning and assessments. Research on how to develop specific competences is still missing. Thus, this teaching module is based on existing research on SE education and activities and tools found to be relevant for SE, and the findings from the TES workshop in 2022, which are all described in detail below.

	<b>Main teaching approaches: Collaborative and active learning</b>			
<b>Learning Outcomes (competences):</b>	<b>Content</b>	<b>Learning activity</b>	<b>Tools for learning</b>	<b>Assessment</b>
<i>Interpersonal Competence</i>				
<i>Normative Competence</i>				
<i>Anticipatory Thinking Competence</i>				
<i>Systems Thinking Competence</i>				
<i>Strategic Competence</i>				
<i>Industry-specific knowledge</i>				

Table 1: Structure of module for teaching sustainable entrepreneurship

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<sup>1</sup> We acknowledge the work from Engage (Centre for Engaged Education through Entrepreneurship) represented by Elli Verhulst (NTNU) who contributed with valuable expertise and inputs in the TES Workshop in Mo i Rana 2022.

## Structure of the Teaching Module

This teaching module is structured after the most important competences for sustainable entrepreneurship found in the literature review in WP1, and we suggest a specific order of which competences should be introduced in the module first. All the competences in Table 1 are important for sustainable entrepreneurship, and they all complement each other in different ways during the sustainable entrepreneurial process. However, in education, some competences are more suitable to introduce to students before others based on their importance for the learning process.

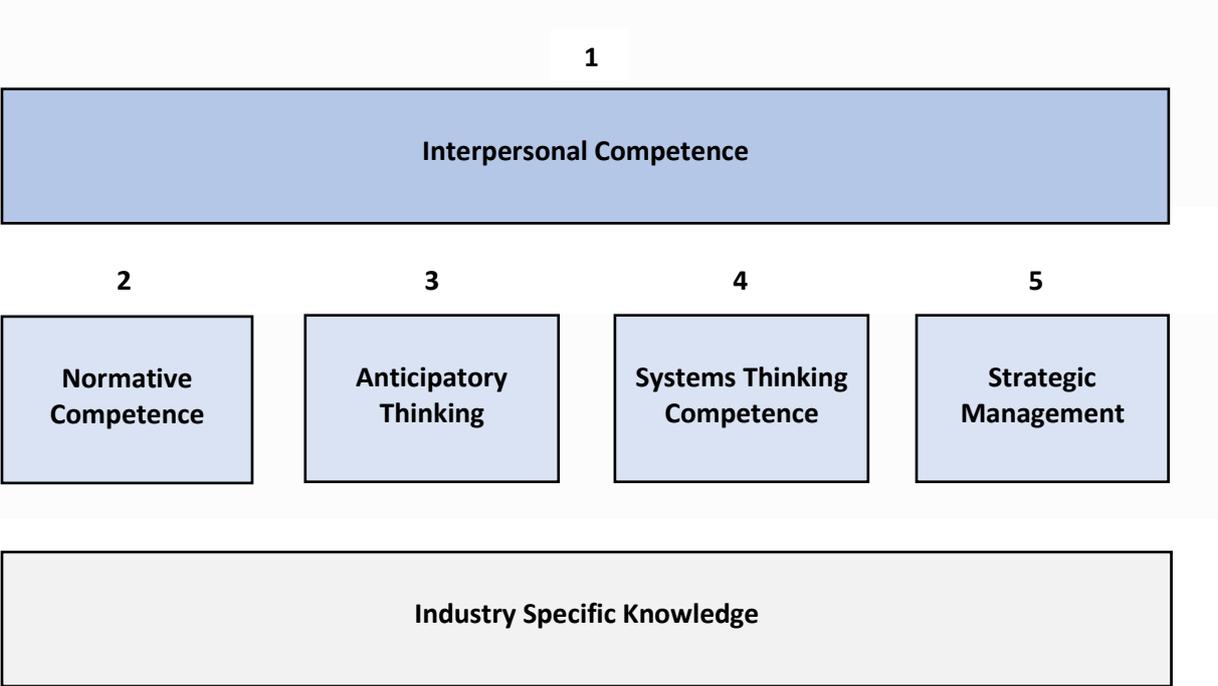


Figure 1: Suggested order of competences in the teaching module

As shown in Figure 1, we suggest introducing interpersonal competence first because it underlies all other competences for SE. SE requires more collaboration and communication during the whole entrepreneurial process compared to normal entrepreneurship (WP1). Sustainable entrepreneurs must communicate with diverse stakeholders, and they need to be able to communicate their values for sustainability in a respective manner. Learning activities that require interpersonal skills such as teamwork and discussions are present in all the following parts of the module. It is therefore valuable for learning purposes that students develop interpersonal skills before the other competences in the module.

Normative competence is seen as the first and most fundamental competence for sustainable entrepreneurship, because it is the ability to use sustainable values in entrepreneurial (WP1). Your own morals and values are the main driver for taking entrepreneurial action for sustainability (WP1), therefore we suggest that this is the second competence in the teaching module. By including normative competence early in the module, students can develop sustainable values to lead their entrepreneurial decision making through the whole module. In other words, students can develop competences to

navigate ethical and moral concerns, and to detect ethical and moral dimensions in sustainability challenges.

According to the WP1 report, there is an overlap between anticipatory thinking and system thinking because both competences think outside of the present and deals with analysing the more uncertain and complicated aspects of sustainability. For example, anticipatory thinking is thinking related to different levels of time such as the past, present, and future, while system thinking deals with thinking of space such as local, regional, and global (WP1). Therefore, anticipatory thinking and systems thinking are introduced in the middle of the module before strategic management competence. Both competences are important for sustainable entrepreneurship, because dealing with sustainability requires entrepreneurs to be able to anticipate the future, but also be able to analyse and understand how systems work and interconnect at a local and global level.

Strategic management comes in after the sustainability-oriented competences, because in order to take action for sustainable entrepreneurship, students should be able to understand sustainable values (normative), anticipate the future of entrepreneurial actions for sustainability (anticipatory), and lastly, understand the system around a business and how entrepreneurial decisions can impact the triple bottom line (systems thinking). All the competences introduced before strategic management competence, will help students to identify opportunities and solve problems for sustainability.

Some competences are more suitable to include throughout the whole module, such as interpersonal competence and industry specific knowledge. Interpersonal competence is included first because of its importance throughout the whole course. Industry specific knowledge is not considered a competence according to competence frameworks for sustainable entrepreneurship (Ploum et al., 2018; Wiek et al., 2014; Lans et al., 2011). This competence is still important for ideas and opportunity recognition (WP1), and we choose to include it for the strategic management section of this teaching module. In this section students will work on developing business models, and industry specific knowledge is therefore suitable to include in this section.

The report is structured as follows: Interpersonal competence, normative competence, anticipatory competence, systems thinking competence, and strategic management competence. Each of these sections include learning outcome, content, activities, and assessment.

# Detailed description of module based on competences

## 1. Interpersonal Competence

Interpersonal competence is described as the ability to facilitate collaborative activities for sustainability and research and being able to motivate and enable these activities (Ploum et al., 2018; Schlange, 2009; Wiek et al., 2011). Interpersonal competence is important for sustainable entrepreneurs because they need to deal with complex realities and they are involved in more dialogue and collaboration than in other businesses (Biberhofer et al., 2018; Tilley and Parrish, 2006).

A sustainable entrepreneur needs the skills to communicate with multi-stakeholder networks, engage in participative teamwork, and be able to collaborate with people in different working cultures (Biberhofer et al., 2018) throughout the whole entrepreneurial process (Foucrier & Wiek, 2019). Thus, skills related to interpersonal competence are communication and collaboration skills, negotiation, empathy and compassion (Lans et al., 2014; De Haan, 2006; Wiek et al., 2011). Introducing these skills to the students at the start of the module will benefit them through the whole course because many of the teaching and learning activities are related to group work and discussions.

### Learning outcomes:

#### **Knowledge**

- Knowledge of communication and collaboration skills, team-processes and team-dynamics.

#### **Skills**

- The ability to work together with actors in converging fields to co-create solutions.
- Convey your own competence in interdisciplinary collaborations.
- The ability to reflect on team-dynamics and team-processes, and on your individual and others' contribution to teamwork.

#### **Responsibility and autonomy**

- To show empathy and compassion for self, community, other life forms and the world around him/her.

### Content

To teach interpersonal competence, we suggest including different theoretical aspects, such as theory about interpersonal competence and what it involves. The following content includes stakeholder collaboration and theory about teamwork, specifically in inter- and transdisciplinary teams. The last step of this part of the module is theory on giving feedback, which can be important for groupwork throughout this module.

### Interpersonal competence

An overarching central element in teaching interpersonal competence in sustainable entrepreneurship education is of course literature on interpersonal competence. Following the view of Halberstadt & Timm et al. (2019), interpersonal competence includes both personal competences such as creativity, empathy, flexibility and self-efficacy, interaction competences such as interdisciplinary competence, network-building and communication skills, and general and specific knowledge. All parts are important for sustainable entrepreneurship as SE often involves a more diverse set of stakeholders to engage with and teamwork (WP1). More specific aspects to be included are therefore suggested in the following.

### Stakeholder collaboration

As sustainable entrepreneurs need to deal with complex realities and multiple stakeholders, an initial process is to identify and assess the interests and needs of different stakeholders who may be affected by the SE initiative, i.e., conducting a stakeholder analysis. The aim of the stakeholder analysis is to develop strategies for engaging stakeholders effectively. Stakeholders who control resources critical to the venture are likely to be addressed actively (Schlange, 2009). See systematic thinking competence – stakeholder analysis for further elaboration.

Next, stakeholder engagement and collaborations are crucial aspects. In education for sustainable entrepreneurship, it is therefore important “to learn how to associate with stakeholders, to obtain their support for the new sustainable offering, and to collaborate extensively, even with competitors, to create markets for more sustainable solutions” (Aarikka-Stenroos et al., 2022, p. 43). This can be trained for example through working in transdisciplinary teams with recognizing and developing sustainable ideas (see also next section).

### **Suggested Syllabus:**

Aarikka-Stenroos, L., Engez, A., & Harala, L. (2022). Bringing environmental sustainability and the circular economy into entrepreneurship education with stakeholders: four case methods from hackathons to role-model cases. In *Reframing the Case Method in Entrepreneurship Education* (pp. 40-52). Edward Elgar Publishing.

Schlange, L. E. (2009). Stakeholder identification in sustainability entrepreneurship. *Greener Management International*, 55, 13-32.

### Inter- and transdisciplinary teams

Issues related to sustainable development should as mentioned be addressed through collaboration of different fields, cultures, and approaches (Lans et al., 2014). Thus, interdisciplinary teams, diverse in terms of different disciplinary backgrounds, spheres of activity, and cultural backgrounds (Cincera et al., 2018) are central in SEE. According to Cincera et al. (2018), diverse teams have a lot of innovation potential as they are considered better in generating new ideas. There are, however, also identified certain barriers to successful collaboration in interdisciplinary teams in respect to the management of group dynamics within (Cincera et al., 2018).

In existing SE study programs, the WP1 report found that in most cases problem- or challenge-based learning is combined with inter- and transdisciplinary learning; interdisciplinary learning meaning teams consisting of students from different backgrounds working together, while transdisciplinary learning means teams consisting of students working with people from outside the university, such as businesses and other communities of society, as partners/stakeholders (cf.0. Karlusch et al. (2018) report some of the upsides of inter- and transdisciplinary teams when studying a 15-week course where artists were added to interdisciplinary teams of business and engineering students that had to come up with a start-up idea.

*Team formation* is, thus, a primary factor in team collaboration. Earlier literature has proposed two principals by which teams might form; a) selecting team members based on pragmatic instrumental criteria such as complementary skills and experiences, and b) based on interpersonal fit between team members (Aldrich and Kim, 2007). It should be noted that these are not mutually exclusive, however, it is often found that familiarity and propinquity dominate the dynamics of team formation (Aldrich and Kim, 2007), also in entrepreneurial founding teams (Warhuus et al., 2021). Thus, there are several possible downsides related to self-selecting teams in sustainable entrepreneurship education one should be aware of when working on team formation both in theory and practice (Oakley et al., 2004). To expose students to a variety of ideas, heterogeneous teams are generally preferred in educational settings.

Sustainable entrepreneurial teams require individuals with diverse skills who are committed to achieving their goals. Having different *team roles* in an SE team is important as it promotes collaboration, innovation, efficiency, and risk management, all of which are vital for the growth and sustainability of a business, in turn also ensuring its success. In an educational setting, models such as Belbin's team role model could be useful for mapping and understanding each team member's skills and contributions, in term contributing to effective team functioning. Diversity Ice Breaker is also a relevant tool for exploring the roles of team members.

### **Suggested Syllabus:**

Aldrich, H. E., & Kim, P. H. (2007). Small worlds, infinite possibilities? How social networks affect entrepreneurial team formation and search. *Strategic Entrepreneurship Journal*, 1(1-2), 147-165.

Benne, K. D., & Sheats, P. (2007). Functional roles of group members. *Group Facilitation*, (8), 30.

Cincera, J., et al. (2018). "Designing a sustainability-driven entrepreneurship curriculum as a social learning process: A case study from an international knowledge alliance project." *Journal of Cleaner Production* 172: 4357-4366.

### Feedback in teams and education

The development of interpersonal competence including teamwork skills is an ongoing process. To develop teamwork skills, feedback should be incorporated into the learning process and assessment method since it facilitates and encourages students to self-reflect (Willey and Freeman, 2006). Principles and the fear of hurting others means that individuals easily hold back their observations and assessments. However, awareness of how one communicates and interacts is important for well-functioning teamwork, and feedback can help increase the understanding of how one interacts with others. Feedback is thus argued to be key for efficient teams in both business and academic settings.

In an educational setting, formative reciprocal peer feedback, defined as a 'communication process through which learners enter dialogues related to performance and standards' (Liu and Carless 2006), given by students as symmetrical peer-to-peer feedback, is regarded essential (Holen and Sortland, 2022). The involvement of students in peer assessments of oneself, other team-members and the team tend to develop both topical knowledge and social skills (Holen and Sortland, 2022). In SEE, the Sailboat Retrospective tool is an example of a tool that can be used in this matter (see Report on Train-the-trainers for a detailed overview of the different tools). See also Warhuus et al. (2018) for different kinds of feedback models used in process-based entrepreneurship courses that could be adopted to a SEE setting.

### Suggested Syllabus:

Warhuus, J. P., Blenker, P., & Elmholt, S. T. (2018). Feedback and assessment in higher-education, practice-based entrepreneurship courses: How can we build legitimacy? *Industry and Higher Education*, 32(1), 23–32.

## Learning activities and tools

First, we suggest having lectures on the topics suggested for learning content, such as team formation, students' roles in teams, and feedback. For learning activities, we suggest using tools that focus on collaboration and teamwork. For example, the mission which is a tool where students gradually discover vital elements in a sustainable world, after going on a mission in a spaceship. This is a collaborative tool that is good for using early in the course for students to develop their collaboration skills as well as increasing their understanding of sustainability through systems thinking. The Thing from the Future is an imagination game that is suitable to have early in the course. Using game-based tools can be good for developing creativity, learn about sustainability, and they can increase other competences for SE such as systems thinking. More information about the tools can be found in WP3.

Other tools that are suitable for interpersonal competence is the diversity icebreaker which can be used to assess the student's role as a team member in order to create better communication within groups. This tool can be beneficial for students to use early in the module for them to figure out their communication style in groups. We also suggest that students are introduced to collaboration agreements. For group assignments, students can be given a collaboration agreement before starting to work on their project or problem. The collaboration agreement states which roles each team member is assigned, their responsibility, and how they will handle conflicts throughout the process. We also suggest that students give each other feedback as part of the learning activities in order to develop feedback and communication skills.

## Exam and assessment

For assessing interpersonal competence, we suggest using reflection notes as a formative assessment. Reflection notes are used in courses for innovation and entrepreneurship at Nord university for students to reflect on their teamwork process, and it is used as a summative assessment of such courses with a combination of literature on teamwork (Fauske et al., forthcoming). Students can for example use the sailboat retrospective tool to reflect on the teamwork process together as a group. They can also use individual reflection notes. The reason for using reflection notes for assessing interpersonal competence is that the learning activities in this part of the module, such as tools like the mission, is used as an introduction to interpersonal competence and sustainability. It is not an assignment, but a more game-based approach to education. Therefore, the students do not need to be graded for this part of the course, and the reflection notes can instead be graded as a pass- or no pass submission.

After using the game-based tools for collaboration and discussion, students can reflect on their roles and communication styles in team settings. Because students are not given an assignment to submit in this first part of the module, using reflection notes as an assessment of their experience with using tools is the best approach. Another reason for using reflection notes as a part of the assessment for interpersonal competence is that students get to reflect on the collaboration process and learn from the experience of collaborating in a group setting. In the reflection note assignment students can use literature on teamwork such as with

courses at Nord university (Fauske et al., forthcoming), to show their understanding of the collaboration process.

## 2. Normative Competence

The next competence in the module is normative competence, which is a set of values a person possesses related to sustainability and being able to use those values to make ethical decisions for sustainability. It is the ability to map and apply values, principles and targets for sustainability, and integrate these values with internal and external stakeholders (Ploum et al., 2018; Blok et al., 2015; Wiek et al., 2011). Normative competence also focuses on the ability to question one's values, and to use values for sustainability as an axis for making entrepreneurial decisions (Biberhofer et al., 2018). This competence, and the values related to it, should according to Lans et al. (2014) enable professionals to analyse and improve the environmental impact on social ecological systems.

### Learning outcomes:

#### **Knowledge**

- Understanding the values underlying entrepreneurship and sustainability and the possible tensions arising in the intersection between them.

#### **Skills**

- The ability to articulate your own values and intentions and meet others' values with respect and understanding.

#### **Responsibility and autonomy**

- Participate respectfully in a wider societal discussion.

### Content

Doing the right thing is the main driver for sustainable entrepreneurship (WP1). But in order to do the right thing, sustainable entrepreneurs need to have a good understanding of sustainability and the sustainable development goals (SDGs). It is also important for sustainable entrepreneurs to be able to take sustainable values into consideration when they take entrepreneurial action. Therefore, we suggest including content on the SDGs and sustainable values. A sustainable entrepreneur should also know how businesses take sustainable action, CSR.

### UN Sustainable development goals (SDGs)

The SDGs are proposed by the UN as a universal call to action to end poverty, protect the planet and improve the lives and prospects of everyone, everywhere. To bring together all 17 goals, system thinking, and collaboration is crucial. Hence, in sustainable entrepreneurship

the SDGs are connected to entrepreneurial collaboration and collaborative entrepreneurship. Shaltegger et al. (2018) bring insight into this by proposing two types of collaboration for sustainable entrepreneurship; horizontal collaboration to address potential synergies and the challenge of non-intended consequences across sustainability issues, and vertical collaboration to coordinate the interplay between individuals, business ventures, civil society, and policy makers across sectors and governance levels.

Other interesting topics to include about the SDGs are why they are important and the implications of not achieving them. The 17 SDGs are important because they address essential human needs, manage climate change, contribute to financial stability, and sustaining biodiversity (Filho et al., 2020). However, achieving and implementing these goals can be challenging, such as difficulty in achieving collective action for the goals, financial constraints in implementing them, and trade-offs and conflicts between the different goals (Filho et al., 2020). Including content about the importance of achieving these goals, and the challenges of implementing them will give students a broad understanding of the SDGs. Content on sustainability and the SDGs will increase the understanding sustainable values that are important for normative competence, and including the topic of trade-offs and conflicting goals can increase system thinking competence.

In addition to content on the SDGs and what they are, we suggest including a tool that students can use to learn about the SDGs. This tool is called the SDG Impact Assessment Tool. It is used to measure the sustainable impact of projects, solutions, and businesses on all the 17 sustainable development goals.

### **Suggested Syllabus:**

Filho, W. L., Wolf, F., Lange Salvia, A., Beynaghi, A., Shulla, K., Kovaleva, M., & Vasconcelos, C. R. (2020). Heading towards an unsustainable world: some of the implications of not achieving the SDGs. *Discover Sustainability*, 1, 1-11.

Schaltegger, S., Beckmann, M., & Hockerts, K. (2018). Collaborative entrepreneurship for sustainability. Creating solutions in light of the UN sustainable development goals. *International Journal of Entrepreneurial Venturing*, 10(2), 131-152.

Chalmers, G. M. V. (2019). The SDG Impact Assessment Tool-a free online tool for self-assessments of impacts on Agenda 2030. *Policy*, 1, 150-167.

### **Values for sustainable entrepreneurship**

Values are important drivers for sustainable change, and the transformation to a sustainable society requires a change in people's values (Horlings, 2015). Successful change agents for sustainability need a value system to guide their entrepreneurial actions (Svanstrøm et al., 2008). Values can be described as what is important to a person, and in sustainability, a common value is that we should take care of the planet (Komasinski & Gakushi, 2017). For example, sustainable values seek to minimise environmental impact, reduce consumption of

resources, and protect the biophysical system of earth (Marcus et al., 2015). A sustainable entrepreneur will also consider social values when making decisions. Social values are concerned with the well-being of all people in society, and it includes understanding the value of human life, meeting human needs and human rights (Marcus et al., 2015). This competence, and the values related to it, should according to Lans et al. (2014) enable professionals to analyse and improve the environmental impact on social ecological systems.

### **Suggested Syllabus:**

Horlings, L. G. (2015). The inner dimension of sustainability: personal and cultural values. *Current Opinion in Environmental Sustainability*, 14, 163-169.

Wamsler, C., & Bristow, J. (2022). At the intersection of mind and climate change: Integrating inner dimensions of climate change into policymaking and practice. *Climatic Change*, 173(1-2), 7.

### **The Mindset of a Sustainable Entrepreneur**

A sustainable entrepreneurial mindset is best understood in comparison to the mindset of a traditional entrepreneur. A traditional entrepreneurial mindset can be described as an attitude of an individual that creates new ventures (Zemlyak et al., 2022). This mindset is the ability to identify and evaluate new opportunities, take risks, be motivated, and to take action to realize opportunities (Zemlyak et al., 2022). Moon (2013) described the mindset of a sustainable entrepreneur as more compassionate and emphatic towards the SDGs than of a traditional entrepreneur.

A sustainable entrepreneurial mindset is also the ability to identify opportunities, take risks, and take entrepreneurial action, but with sustainable intent. Which means that the decisions of a sustainable entrepreneur are guided by a more sustainability-oriented mindset compared to a traditional entrepreneur. Uvarova et al. (2021) presents a model of the sustainable entrepreneurial mindset, which includes environmental concern and knowledge of environmental protection and sustainability. They also include competences such as critical thinking, creativity, initiative, reflection, and sharing as important for a sustainable entrepreneurial mindset (Uvarova et al., 2021).

### **Suggested Syllabus:**

Moon, C. J. (2013). Where are all the Ecopreneurs? The development of a construct for Eco-entrepreneurship. In *Institute for Small Business and Entrepreneurship (ISBE) 2013 Annual Conference*.

Uvarova, I., Mavlutova, I., & Atstaja, D. (2021). Development of the green entrepreneurial mindset through modern entrepreneurship education. In *IOP Conference Series: Earth and Environmental Science* (Vol. 628, No. 1, p. 012034). IOP Publishing.

Zemlyak, S., Naumenkov, A., & Khromenkova, G. (2022). Measuring the Entrepreneurial Mindset: The Motivations behind the Behavioral Intentions of Starting a Sustainable Business. *Sustainability*, *14*(23), 15997.

### Philosophy of justice

Rawls philosophy of justice can be used in education to understand and discuss sustainability and economic growth using an intergenerational perspective. Henderson (2011) developed a framework to address this issue, which examines the problem of economic growth and intergenerational justice. The framework is based on two main principles of Rawls (1973) philosophy of justice. The first principle of Rawls theory is shifting away from the unsustainable economic model of continuous growth. The alternative to this economic model is a model focused on economic development through just institutions, where just institutions are all institutions that influence people's lives (Henderson, 2011). The second principle of Rawls theory of justice suggests a just distribution of natural resources and services between present and future generations. Therefore, the economic development of the present should not hinder the opportunities of future generations to live a good life and to benefit from natural resources. (Henderson, 2011).

### Suggested Syllabus:

Henderson, G. E. (2011). Rawls & Sustainable Development. *McGill International Journal of Sustainable Development Law and Policy / Revue Internationale de Droit et Politique Du Développement Durable de McGill*, *7*(1), 1–31.

### CSR – business ethics

One way for companies to be sustainable is by integrating corporate social responsibility (CSR) into their strategy (Dahlsrud, 2008). CSR can be defined as a voluntary concept where companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders (Commission of the European Communities, 2001). CSR has five different dimensions, where three of the dimensions are concerned with the triple bottom line: economic, social and environmental dimensions (Dahlsrud, 2008). The other dimensions are stakeholder and voluntariness dimensions (Dahlsrud, 2008). The stakeholder dimension can be concerned with how they treat and interact with employees and suppliers. The voluntariness dimension is based on companies taking sustainable or social action voluntarily, and without following legal obligations to do so (Dahlsrud, 2008).

The nature of CSR is complex because it concerns problems that are difficult to solve (wicked problems), such as social problems and environmental problems (Sheehy, 2015). The dimensions of CSR, such as the economic, social and environmental dimensions, are also complex and dynamic systems to navigate (Sheehy, 2015). The complexity of CSR makes for some good ethical discussion points in class that can be valuable for competences such as normative competence and systems thinking competence. Sheehy (2015) mentions an example of companies in the first world being responsible for the employees of their subcontractors in developing countries. It is possible to discuss to which extent companies are responsible (normative competence) and include the complexity of the problem with the different stakeholders that are involved (anticipatory competence).

### **Suggested Syllabus:**

Dahlsrud, A. (2008). How corporate social responsibility is defined: an analysis of 37 definitions. *Corporate social responsibility and environmental management*, 15(1), 1-13.

Sheehy, B. (2015). Defining CSR: Problems and solutions. *Journal of business ethics*, 131, 625-648.

Commission of the European Communities. 2001. Promoting a European Framework for Corporate Social Responsibilities, COM (2001) 366 final, Brussels.

### **Learning activities and tools**

For normative competence we recommend starting with a lecture on sustainability and the United Nations Sustainable Development Goals (SDGs). Since normative competence is about doing the right thing, students need to understand sustainability before learning to do what is right. We also suggest including an article about why implementing the SDGs are important, and the challenges of implementing the SDGs (Filho et al., 2020). This article can be used as a starting point for discussions in class, which is a suggested learning activity for normative competence.

After learning about the SDGs, students can be introduced to values for sustainable entrepreneurship, and what a sustainable entrepreneur mindset is. The values a sustainable entrepreneur possess, such as environmental and social values, are their mindset, are the drivers of their entrepreneurial decision. For both topics, we suggest including activities such as reflection. Reflection can be used for students to reflect upon their own values for sustainability, and it is a suitable learning activity for education focused on sustainability (Howlett et al., 2016).

The next step for developing normative competence is to learn about philosophy of justice. The article by Henderson (2011) presents the theory about economic growth, sustainability, and our ethical responsibility as a society to handle natural resources so that future

generations have the same opportunity to live a fulfilling life. The theory of justice can be used for discussions in class about our responsibility to live a sustainable life. Discussions are used in other courses for sustainability, where students can develop critical thinking skills (Howlett et al., 2016), as well as communication skills.

CSR is the last topic of the normative competence part of this module. After learning about CSR in a lecture, discussions and debates can be used as learning activities. Discussions are good to use in education for sustainable development, where students discuss political, economic, social, and ecological aspects of sustainability (Howlett et al., 2016). This teaching activity can help students develop critical thinking skills and communication skills, and students can also learn to use strategic questioning for discussions (Howlett et al., 2016). Debates can also be used as a learning activity, and it is possible to have role-play debates where different students represent different stakeholders for a company. A tool to use for discussions and debates is the Time-Out Dialogue (Pyykkö et al., 2022).

Presentations are also a good teaching activity when learning about CSR and the philosophy of justice. Presentations can also be used as a starting point for discussions in class. For example, students can be divided into different groups and present companies that are working towards sustainability. After each presentation, a discussion can be held.

### Exam and assessment

For assessing normative competence, which is a more value-oriented competence (Ploum et al., 2018), it is best for students to be assessed by self-reflection notes just as with interpersonal competence. By using reflection-notes as the assessment for this part of the module, students can reflect on their values and understanding of sustainability. They can also reflect on discussions and debates in class and submit reflection notes based on this. Here, we also suggest using literature for the submission of reflection notes, but for normative competence, students can use literature about sustainability and entrepreneurship. Specifically, literature about sustainable values, philosophy of justice, and other literature that fits the student's topics of reflection on values and sustainability.

### 3. Anticipatory Thinking

Anticipatory thinking is the next competence to be introduced in the module. Anticipatory thinking is also called future thinking, and it is the ability to think long-term, to cope with risk and uncertainty, and to develop capabilities for a more sustainable future (Biberhofer et al., 2018). It is an important competence to teach students for sustainable development because society is changing fast, and students need this competence to tackle complexity, uncertainty and risk (Ploum et al., 2018). Anticipatory thinking is the ability to anticipate problems that could arise in the future (Foucrier & Wiek, 2019), and most importantly being able to analyse the future impact of decisions on environmental, social, and economic issues (Wiek et al., 2011).

## Learning outcomes:

### Knowledge

- Understand how actions in the past, present and future impact the triple bottom line.
- Understand risk and uncertainty for entrepreneurship and sustainability.

### Skills

- Can use methods and tools for measuring impact of strategic decisions.
- Being able to develop and analyze future scenarios.

### Responsibility and autonomy

- Embrace a solution-driven mindset to lead solutions for future sustainable development.

## Content

To teach anticipatory thinking we suggest including theoretical aspects such as risk evaluation for students to be able to analyse and handle risks related to entrepreneurial decision and sustainability. After learning how to evaluate risk, students learn about effectuation which is a logic for managing risk and uncertainty as an entrepreneur. (Resilience and impact). Lastly, the tragedy of the commons should be introduced for students to learn about, and anticipate, the environmental and economic impact of overconsumption.

### Risk and uncertainty in entrepreneurship

All entrepreneurs make decisions under risk and uncertainty, and even though the concepts are similar, there are some differences between them. Risk is the possibility of failure or loss when pursuing entrepreneurial goals (Hatten, 2015). Under risk, all outcomes and the probability of each outcome are known (Mousavi & Gigerenzer, 2014). Risk can for example be financial risk, or market risk. In sustainable entrepreneurship, risk can be related to the environment, because the decisions a sustainable entrepreneur take can impact the environment. Uncertainty, unlike risk, is to the lack of knowledge or information about the future that can impact the success of entrepreneurial decisions (Sarasvathy, 2001). In entrepreneurship, uncertainty can for example be technological uncertainty, because it is unknown which technological advances will be made in the future. According to Sarasvathy (2001), successful entrepreneurs use an effectual logic when making entrepreneurial decisions under risk and uncertainty.

### Suggested Syllabus:

Knight, F. H. 1921. Risk, uncertainty and profit. New York: Houghton Mifflin.

Sarasvathy, S. D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of management Review*, 26(2), 243-263.

### Effectuation for managing risk and uncertainty

Entrepreneurs use different logics when making decisions. A causal logic is one way for entrepreneurs to think when making decisions, and it starts with the effect that is to be created (Sarasvathy, 2008). The entrepreneur then selects or creates new means to achieve the desired effect (Sarasvathy, 2008). With a causal logic the goal is selected first. Effectual logic is another way for entrepreneurs to make decisions, and this logic starts with the means that are available, and effects are created with the available means (Sarasvathy, 2001). The difference between these logics is that a causal logic seeks to predict the future, and an effectual logic seeks to control the future with the resources you have today.

According to Sarasvathy (2008), there are five principles for effectuation that entrepreneurs use when making decisions. The principles involve using the resources and means that are available for decision making processes, and they determine the outcome of the process. Sarasvathy's five principles of effectuation (Sarasvathy, 2008 p.21):

- **The patchwork quilt principle.** Working with the means at hand to create something new.
- **The affordable loss principle.** Be prepared for what you are willing to lose ahead of time.
- **The bird-in-hand principle.** Stakeholders who are involved and committed to a project determine the goals.
- **The lemonade principle.** Focus on leveraging challenges and surprises, instead of trying to fix them.
- **The pilot-in-the-plane principle.** Human agency is the main driver for opportunity.

Research shows that an effectual logic is better for managing risk and uncertainty as an entrepreneur (Welter & Kim, 2018). When an entrepreneur can very accurately predict the future, a causal logic is better for managing risk and uncertainty (Welter & Kim, 2018). For a sustainable entrepreneur, it is difficult to accurately predict the future. It can be difficult to know which technological advances will be made in the near future, and it is also difficult to know how fast climate change will happen. In general, an effectual logic is shown to better impact the performance of companies, especially when it is difficult to accurately predict the future (Welter & Kim, 2018).

### Suggested Syllabus:

Sarasvathy, S. D. (2022). Elements of Entrepreneurial Expertise. *Effectuation*. Edward Elgar Publishing.

Welter, C., & Kim, S. (2018). Effectuation under risk and uncertainty: A simulation model. *Journal of Business Venturing*, 33(1), 100-116.

Sarasvathy, S. D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of management Review*, 26(2), 243-263.

## **Risk Evaluation**

All entrepreneurs deal with risk and uncertainty when making decisions, and the topic of risk and uncertainty in entrepreneurship can be dated back to Knight (1921). In entrepreneurship, risk can be related to financial or legal aspects, but in sustainable entrepreneurship risk also include environmental and social risk. There are many tools that can be used to evaluate risk, such as the future wheel that analyses possible effects from a change, solution or event. Future scenarios are a tool that can be used to analyse risk and select future strategies based on stories of how different scenarios about the future environment.

For evaluating the risk of an entrepreneurial idea or solution, students can use an online template created by Lucidchart which follows these five steps (Lucidchart, n.d.):

1. Identify hazards.
2. Decide who might be harmed and how.
3. Evaluate the risks and decide on the precautions.
4. Record your findings and implement them.
5. Review your assessment and update if necessary.

## **Suggested Syllabus:**

A Complete Guide to the Risk Assessment Process. (n.d.). Lucidchart. Retrieved March 29, 2023, from lucidchart.com

## **Tragedy of the commons**

The tragedy of the commons was first described by Hardin in 1968, and it is a popular theory within economics and environmental science. The theory explains how systems are interconnected, and how the overconsumption of common environmental resources can lead to its destruction. Hardin explained that individuals who have access to a common pool of resources will act in their own interest and overconsume that resource. For example, fishermen who has access to the same stock of fish, will act in their own interest and get as many fish as they desire, without considering how it will impact the fish stock. This overconsumption will eventually lead to the depletion of the common-pool resources, and the fishermen will not have any more fish to catch, causing the tragedy of the commons.

This example teaches students how current actions such as the overconsumption of limited resources can impact the future, making it an important example to include in lectures focused on anticipatory competence. It also shows how the systems surrounding fish stocks can be disrupted by overconsumption, which makes it a good example for systems thinking as well

as anticipatory thinking. There is a game that simulates the fishing example of tragedy of the commons, and we suggest using it in the course.

### **Suggested Syllabus:**

Tragedy of the commons. (*n.d.*). Retrieved March 29, 2023, from: [education.mit.edu](https://education.mit.edu)

Hardin, G. (1968). The tragedy of the commons: the population problem has no technical solution; it requires a fundamental extension in morality. *Science*, 162(3859), 1243-1248.

### **Learning activities and tools**

For starting the module on anticipatory thinking, there should be a lecture on risk and uncertainty in entrepreneurship followed by a lecture on effectual thinking. Effectual thinking is a logic expert entrepreneurs use to handle risk and uncertainty (Saravathy, 2008), and it can be beneficial for students to be introduced to effectual thinking before they are given any assignments.

We suggest using case studies as a learning activity for anticipatory thinking. Because anticipatory thinking is described as “the ability to collectively analyse, evaluate, and craft pictures of the future in which the impact of local and/or short-term decisions on environmental, social, and economic issues is viewed on a global/cosmopolitan scale and in the long term” (Wiek et al., 2011). Case studies in this module should be based on businesses or organizations that include aspects for analysing and predicting the outcome of future activities, on a local and global scale. Case studies can be found in the Case study book for entrepreneurship education (Aaboen et al., 2022). In addition to using case studies in group assignments, they can be used to start discussions in class. It is then suggested that students read the case before the lecture to set aside time for the discussion in class.

Another important aspect to include in this part of the module is tools that students can use to measure the impact sustainable entrepreneurial solutions and ideas. There are many tools that can be used for anticipatory thinking, such as the future wheel which analyses and identifies different outcomes of an idea or solution. The future scenarios tool can be used to select future strategies based on stories of different scenarios about the future environment. Tools can also be used in class for students foster group discussions. The mission is a great tool for students to work together and to discuss an anticipated future where they leave in a spaceship, and they must figure out which resources are the most important to bring. More on these tools for anticipatory thinking can be found in WP3.

## Exam and assessment

For assessment we suggest that students make a poster for their case studies. The posters can be presented or pitched in front of the class, a panel, or stakeholders. If the students hold a presentation in front of the class, peer to peer evaluation could be used as a formative assessment model. In addition to a poster presentation, students can deliver a short report on their case with reflection notes on their process and groupwork.

## 4. System thinking competence

System thinking is described as “the ability to identify and analyse all relevant (sub)systems across different domains (people, planet, profit) and disciplines, including their boundaries” (Ploum et al., 2018) and is one of the core competences for SE, mostly needed in the beginning of the entrepreneurial process (Foucrier & Wiek, 2019). It is also the ability to understand how the subsystems are interconnected (Lans et al., 2014). There are three main elements of systems thinking: being able to understand and handle how complex sustainability is, understanding how things are interconnected, and being able to see things with different perspectives (Biberhofer, Lintner, Bernhardt, & Rieckmann, 2019).

### Learning outcomes:

#### Knowledge

- Insight into relevant elements of entrepreneurial ecosystems.
- Insight into discipline specific systemic elements.
- Insights on how the elements of EE and the discipline specific systemic elements (3Ps) are interconnected.

#### Skills

- To be able to use relevant system thinking methods.
- The ability to use systems thinking to integrate research and practical problem-solving.

#### Responsibility and autonomy

- Understand and reflect upon the interconnectedness in systems and how changes in one part of a system affect other parts of the system.

### Content

To teach systems thinking competence we suggest introducing students to the concept of systems thinking first, followed by entrepreneurial ecosystems, wicked problems, and stakeholder analysis.

### Literature on system thinking

The most central aspect is of course literature on system thinking. This literature uses system thinking on different levels from the seminar works of Senge (1990) that focused on the firm level to systems on wider regional, national and international levels. Within sustainability the policy and governmental perspective of systems thinking is increasingly important (Voulvoulis et al., 2022), and an understanding on governance and political systems is important for systems understanding. According to Voulvoulis et al. (2022), it is impossible to predict how changes in regulations will impact stakeholders and their reactions to these changes. Understanding how even small regulatory changes can impact stakeholders and their decision making, can help students increase their understanding of systems for sustainability and how complex they are. This is why we also suggest including content on wicked problems and stakeholder analysis in lectures, which can be paired with literature on policy and regulations for sustainability.

### Suggested Syllabus:

Senge, P. M. (1990). *The art and practice of the learning organization*.

Voulvoulis, N., Giakoumis, T., Hunt, C., Kioupi, V., Petrou, N., Souliotis, I., & Vaghela, C. J. G. E. C. (2022). Systems thinking as a paradigm shift for sustainability transformation. *Global Environmental Change*, 75, 102544.

### Entrepreneurial Ecosystems

Entrepreneurial ecosystems are defined by Stam & Spigel (2016) as sets of interconnected entrepreneurial actors who are independent and exist within systems that are coordinated for enabling entrepreneurial activities. These ecosystems include potential or existing entrepreneurial actors, organisations such as banks or venture capitalists, and institutions like universities or public agencies (Mason & Brown, 2014). All these actors work together within the same system to “produce and sustain entrepreneurial activity” (Roundy, Bradshaw & Brockmann, 2018). By including content on entrepreneurial ecosystems in education for sustainable entrepreneurship, students can increase their systems thinking abilities by understanding how the different actors within this system collaborate. They will also learn about the forces that impact and support entrepreneurial activities within this system, whether the forces are societal, individual or organizational (Roundy et al., 2018).

The entrepreneurial ecosystem playbook (EEPB) can be used as a resource for students in lectures on entrepreneurial ecosystems. The playbook includes a definition of entrepreneurial ecosystems, examples of which successful ecosystems exist today such as the Silicon Valley ecosystem, and a list of key elements in such a system. For example, the system is successful when talented people, entrepreneurs, institutions with knowledge resources, intersections and culture is included as key elements in the ecosystem (EEPB, 2019). All these key elements are described shortly in the playbook, which makes it suitable to use as content in lectures. The playbook also emphasizes the importance of culture and diversity in the ecosystem, and how social capital and trust can foster innovation and entrepreneurship (EEPB, 2019).

## **Suggested Syllabus:**

Stam, F. C., & Spigel, B. (2016). Entrepreneurial ecosystems. *USE Discussion paper series*, 16(13).

Entrepreneurial ecosystem playbook (EEPB). (2019). ESHIP SUMMIT. Retrieved March 28, from: [kauffman.org](http://kauffman.org)

### **Wicked problems and the impossibility to solve them**

Wicked problems were first described by Rittel & Weber in 1973 as problems that have no single solution and are too complex to solve by regular methods. Wicked problems are also difficult to define because of their complexity, they include various stakeholders with different needs, and attempting to solve them can cause new problems (Rittel & Weber, 1973). The Covid-19 crisis is a good example of when attempting to solve a wicked problem causes new problems to emerge. Restrictions set in place to hinder the spread of the Covid-19 virus, such as lockdowns and social distancing measures, had a significant impact on the world economy, especially on the tourism industry (Yamaka et al., 2022). For sustainable entrepreneurship education, sustainability can be understood as a wicked problem.

But how should wicked problems be included in education? In a lecture, students should learn about the concept of wicked problems, its characteristics, and why such problems are difficult to solve. Sharp et al. (2021) suggest using problem-based learning approaches in education for wicked problems, where students work on cases including problems with multiple perspectives given by local businesses. They emphasize the importance of giving the students local cases instead of global cases on sustainability, because they can be too complex and overwhelming to solve (Sharp et al., 2021). Having students work on problems with multiple perspectives, after they learn about the complexity and characteristics of wicked problems, can help them increase their systems thinking abilities.

The global climate crisis is probably the most important example of a wicked problem to include in education for sustainable entrepreneurship. Since the climate crisis is a wicked problem, it can be valuable for students to learn about the concept and characteristics of a wicked problem in the context of sustainability. The climate crisis is a wicked problem because it involves multiple interconnected systemic factors, such as environmental, social and economic factors. It impacts the global society and future generations, making it more challenging to find a solution for everyone. There is no clear solution to the crisis, and trying to solve it can create new problems.

Wicked problems emerge from the interaction of various stakeholders who have different interests and values (Kłeczek et al., 2020). Students can therefore learn about stakeholder analysis in order understand the different needs of each stakeholder, and how stakeholders

can work together to solve sustainability problems. This type of analysis can for example be included in projects that focuses on sustainability issues as wicked problems.

### **Suggested Syllabus:**

Rittel, H. W., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy sciences*, 4(2), 155-169.

### **Stakeholder Analysis**

Sustainability issues are complex, and they often involve multiple stakeholders with different and opposing interests. It can therefore be necessary to include a stakeholder analysis in education for sustainable entrepreneurship. A stakeholder analysis can be used to identify all the major stakeholders involved in a project or business, and it includes steps for assessing the needs and interests of the stakeholders (Allen & Kilvington, 2010). By including this analysis in education, students can increase their awareness of which stakeholders are involved in certain businesses or projects, and the role of the stakeholders that are involved in sustainability systems. Stakeholder analysis is found to help students better understand business problems in project-based learning (Kłeczek, Hajdas, & Wrona, 2020). The book chapter by Allen & Kilvington (2010) describes how a stakeholder analysis can be done by analysing major stakeholders in a project.

### **Suggested Syllabus:**

Kilvington, M., & Allen, W. Social Learning. (2010). Stakeholder Analysis, Chapter 25. *Hatched*, 215.

### **Learning activities and tools**

Activities for teaching system thinking competence are lectures, case studies and group work. Some of the content presented above will be included in lectures, and students will learn about the tools and methods for sustainable entrepreneurship in the lectures of this module. The information about teaching activities in sustainable entrepreneurship education is limited. However, learning approaches such as collaborative learning and experiential learning are found to be used the most in education for sustainable development and education for entrepreneurship (Mindt & Rieckmann, 2017). Case studies are found to be suitable for sustainable entrepreneurship education (Fauske et al., 2022; Tejedor et al., 2018; Torres & Parini, 2019; Hägg & Gabrielsson, 2020; Del Vecchio et al., 2021).

We suggest using case studies as a learning activity for system thinking. Because systems thinking is described as “the ability to identify and analyse all relevant (sub)systems across

different domains (people, planet, profit) and disciplines, including their boundaries” (Ploum et al., 2018). Case studies in this module should be based on businesses or organizations with multiple subsystems across the domains of people, planet, and profit. If the case is too small and it lacks the broader perspective of different systems, students might risk not developing this competence. Relevant cases studies can be found in the entrepreneurship case book (Aaboen et al., 2022).

The other suggested learning activity for students to develop systems thinking competence is group work. Mindt and Rieckmann (2017) found collaborative learning to be one of the most used learning approaches in higher education for sustainable development and education for entrepreneurship. When students work together in groups, they have an to learn from each other’s perspectives, which can be useful for developing systems thinking competence. Learning activities such as lectures, group work and case studies can be used with a collection of opportunity tools for sustainable entrepreneurship.

### Exam and assessment

To assess system thinking competence we suggest a case study analysis as an exam. This can be an analysis of a local or regional system relevant for the study program. In the analysis, students should (1) map a system (2) point to where in the system a change can be made and (3) discuss what impact can that change make to the system. Depending on the extent and scope of the assignment, the assessment could be either a presentation of the case analysis, a poster illustrating the different parts of the assignment or a written report where students also can reflect theoretically on the assignment.

## 5. Strategic Management Competence

Strategic competency is the ability to recognize and analyse problems, recognize solutions and opportunities, and realize ideas and visions for sustainability (Biberhofer et al., 2018; Parrish, 2010). It is also the ability to design projects and implement changes and strategies for sustainable development (Ploum et al., 2018; de Haan, 2006; Wiek et al., 2011). Related skills for this competence are planning skills, analysing, organizing and leading skills (Ploum et al., 2018; de Haan, 2006; Wie et al., 2011). Action competence is also included in strategic management competence (Ploum et al., 2018). It is the ability to be involved in actions for improving the environment, and was it was merged with strategic management competence after Ploum et al. (2018) found a strong correlation between the competences. In SE competence frameworks industry specific knowledge is not listed as a competence for SE (WP1). However, Industry specific knowledge is fundamental for recognizing opportunities and developing them and is strongly connected to the strategic management competence.

Based on the findings in WP1, we also chose to include opportunity identification competence in the section for strategic management competence. According to the WP1 report,

opportunity identification is a competence for “regular” entrepreneurs and is not mentioned as part of any of the sustainable entrepreneurial competence frameworks. They argued that the competence of recognizing and acting upon opportunities could be seen as a part strategic management competence, anticipatory competence and systemic competence. We choose to include opportunity recognition in the section about strategic management competence because it fits well with the content of this section of the teaching module where we include content and teaching activities where students develop business models.

## Learning outcomes:

### Knowledge

- Knowledge of sustainable entrepreneurship, entrepreneurial processes, methods and tools

### Skills

- Can recognize and analyze problems, see new opportunities and possible solutions, ability to bring visions, ideas and solutions of SDE ‘down to earth’

### Responsibility and autonomy

- to put sustainable development at the center of entrepreneurial activity

## Content

To teach strategic competence, we suggest including different theoretical aspects such as sustainable entrepreneurship, opportunity recognition and development, sustainable business models, and lastly venture launch.

### Sustainable entrepreneurship

There are many definitions of sustainable entrepreneurship in the literature, and the review by Terán-Yépez et al. (2020) gives an overview of the different definitions and provide a good starting point to get an overview of the status in the field. In a lecture, students should learn about the concept of sustainable entrepreneurship, different definitions, and the sustainable entrepreneurial process. The sustainable entrepreneurial process consists of how entrepreneurs recognize, develop and exploit opportunities for sustainable development (Matzembacher et. al, 2019). Opportunity recognition refers to recognizing a solution to a sustainability problem, while opportunity development refers to the outcome of activities (ex. marketing mix, business model, resource orchestration) to develop the business concept. Venture Launch and Business Exploitation refers to the commercialization of the sustainable product or service in the market and involves the preparation before launching such as strategy development and acquiring missing resources. Through the sustainable

entrepreneurial process students will transform intentional behaviour into actionable behaviour (Ploum et al., 2019).

Matzembacher et al. (2019) have developed a model students can use to follow each step in the entrepreneurial process flow: “The Sustainable Entrepreneurial Process Flow” (see Report on Train-the-trainers for a detailed overview of the tool). This model contains five steps. In addition to the three phases mentioned over, the model includes Idea generation and positive impact measurement. Idea generation is closely connected to opportunity recognition, where opportunity recognition is referred to the output of idea generation. Positive impact measurement is the last step in the model and involves assessing the impact of the opportunity. This is closely connected to opportunity development, where assessing the impact on sustainability is essential in creating sustainable business models. Therefore, the phases of 1) opportunity recognition, 2) opportunity development and 3) venture launch and business exploitation will be described more in detail below.

### **Suggested Syllabus:**

Aldrich, H. E., & Kim, P. H. (2007). Small worlds, infinite possibilities? How social networks affect entrepreneurial team formation and search. *Strategic Entrepreneurship Journal*, 1(1-2), 147-165.

Matzembacher, D. E., Raudsaar, M., de Barcellos, M. D., & Mets, T. (2019). Sustainable entrepreneurial process: From idea generation to impact measurement. *Sustainability*, 11(21), 5892.

Terán-Yépez, E., Marín-Carrillo, G. M., del Pilar Casado-Belmonte, M., & de las Mercedes Capobianco-Uriarte, M. (2020). Sustainable entrepreneurship: Review of its evolution and new trends. *Journal of Cleaner Production*, 252, 119742.

### **Opportunity recognition for sustainability**

The recognition of sustainable development opportunities are an important first step to solve social and environmental challenges. Sustainable development opportunities are “opportunities that sustain the natural and/or communal environment as well as provide development gain for others [economic, environmental and social gain for the society]” (Patzelt & Shepherd, 2011, p. 632). Entrepreneurs need prior knowledge of environmental and social problems to identify sustainable development opportunities (see section about wicked problems under Systems thinking), as well as industry specific knowledge such as knowledge of markets, ways to serve markets and customer problems (Patzelt & Shepherd, 2011). Besides knowledge, Patzelt & Shepherd (2011) argue that motivation to sustain the natural and communal environment is an important factor for identifying sustainable development opportunities. They further argue that entrepreneurs that perceive that their

physical and psychological well-being is threatened and have empathy and sympathy for others (an altruistic motivation) recognize more opportunities for sustainable development.

This is in line with Ploum et al. (2019) findings. They find that students with normative competence can recognize more opportunities (business ideas) for sustainable development. In addition, creativity, defined as “the ability to provide a different and innovative approach when faced with a new problem” (Buil et al., 2016) are important for turning sustainability problems and needs into business ideas (Foucrier & Wiek, 2019). Therefore, opportunity recognition for sustainable development is interconnected with the competences of system thinking, anticipatory thinking and normative thinking. Opportunity recognition can be trained by looking at sustainability problems such as SDG’s (see section about UN Sustainable development goals under Systems thinking) and developing possible (business) solutions for these problems (Baggen et al., 2018; Ploum et al., 2019). Root Cause Analysis, Value mapping, Design Thinking, Foresight Tool and Megatrends are examples of tools that can be used (see Report on Train-the-trainers for a detailed overview of the tool).

### **Suggested Syllabus:**

Patzelt, H., & Shepherd, D. A. (2011). Recognizing Opportunities for Sustainable Development. *Entrepreneurship Theory and Practice*, 35(4), 631-652.  
<https://doi.org/10.1111/j.1540-6520.2010.00386.x>

### **Opportunity development for sustainability**

The development of sustainable opportunities is the next step in the sustainable entrepreneurial process (Matzembacher et al., 2019). In this stage students should analyse the feasibility of their idea and develop their business concept. Activities related to describing marketing mix, business models and resources are essential. The Sustainability SWOT Analysis and Backcasting are examples of a tools that could be used as a lecture activity (see Report on Train-the-trainers for a detailed overview of the tool). Depending on the length of the course, students could also make a business plan in this step. A pitch competition where students present their business idea to a panel, could be a relevant lecture activity and/or assessment of this stage. Sustainable business models are described in detail in the next section.

### **Sustainable business models**

Sustainable business models describe how an organization create, deliver and capture value through simultaneously incorporating economic, environmental and social aspects in a sustainable way (Nosratabadi, 2019). Thus, sustainable business models integrate the original business model canvas by Osterwalder & Pigneur (2009) with sustainable aspects and gives a more holistic picture of how the organization affect and respond to social and environmental

sustainability concerns. The Flourishing Business Model Canvas, The Triple Layered Business Model Canvas and the Sustainable Business Model Canvas are examples of frameworks (see Report on Train-the-trainers for a detailed overview of the different tools). In addition, another aspect to include is how digital technologies are embedded in sustainable business models (Gregori & Holzmann, 2020). Moreover, there is an online book named “RESTART Sustainable Business Model Innovation” that provide a framework for business model innovation: “The RESTAR framework”. This framework can be used for business model innovation in existing businesses, but also for inspiration for new entrepreneurs.

Industry specific knowledge is important for developing sustainable business models (Serhan & Yannou-Lebris, 2020). When students describe their sustainable business model they have to “identify a target customer segment, propose a relevant value, identify distribution methods, locate key resources, ensure adequate revenue streams, undertake key activities, organise relevant partnerships, and evaluate the project cost (Serhan & Yannou-Lebris, 2020, p. 21). The students must acquire this information by doing research on trends, consumer behaviour, public concerns and competitive products (Serhan & Yannou-Lebris, 2020). The students also must identify and measure impact (social, ecological and economic) of their business model. Thus, the students gain management capabilities through causal thinking. Causal thinking “take a particular effect as given and focus on selecting between means to create that effect” (Sarasvathy, 2001, p. 245). The other side of effectual thinking, effectuation is described under the section Anticipatory thinking.

These business models should continuously be improved, and leadership skills such as constantly reworking and innovating business models are important to remain competitive and run a successful business (Halberstadt, Schank et al., 2019; Halberstadt, Timm, et al., 2019). This could again be linked back to anticipatory thinking where long-term thinking and coping with risk and uncertainty are important skills (Biberhofer et al., 2018).

### **Suggested Syllabus:**

Gregori, P. and Holzmann, P. (2020) Digital sustainable entrepreneurship: A business model perspective on embedding digital technologies for social and environmental value creation, *Journal of Cleaner Production*, Volume 272, 2020, 122817.

Jørgensen, S., & Pedersen, L. J. T. (2018). *RESTART sustainable business model innovation* (p. 253). Springer Nature. Link to the book: <https://link.springer.com/book/10.1007/978-3-319-91971-3>

Nosratabadi, S., Mosavi, A., Shamshirband, S., Zavadskas, E. K., Rakotonirainy, A., & Chau, K. W. (2019). Sustainable business models: A review. *Sustainability*, 11(6), 1663.

## Venture launch and business exploitation for sustainability

The last step is to prepare the launch of the business, by developing a strategy for launching and acquiring missing resources. Here, the students can do a resource mobilization analysis. The outcome of this step is the launch of the venture. Whether or not the students launch their venture by making their sustainable product or service commercialized in the market depends on the aim and length of the course. However, students can prepare the venture for launching without actually launching it, where the preparation will be a part of the course.

## Learning activities and tools

We recommend starting with a lecture on sustainable entrepreneurship and the sustainable entrepreneurial process, before involving the students in active learning where students solve a real-world problem collaboratively with peers and teachers (Castro, 2020; Karlusch, Sachsenhofer & Reinsberger, 2018), and design a sustainable business model (Serhan & Yannou-Lebris, 2020).

First, the students have to recognize an opportunity for sustainable development: Root Cause Analysis, Value mapping, Design Thinking, Foresight Tool and Megatrends are examples of tools that can be used (see Report on Train-the-trainers for a detailed overview of the tool). Industry specific knowledge is important for recognizing opportunities (Patzelt & Shepherd, 2011), and interdisciplinary teams are especially good at developing innovative business ideas together (Cincera et al., 2018).

Second, the students must develop this opportunity, by using different tools: The Sustainability SWOT Analysis and Backcasting are examples of a tools that could be used as a lecture activity (see Report on Train-the-trainers for a detailed overview of the tool). In addition to one of the sustainable business model frameworks: The Flourishing Business Model Canvas, The Triple Layered Business Model Canvas and the Sustainable Business Model Canvas are examples of frameworks (see Report on Train-the-trainers for a detailed overview of the different tools).

Students need to gather relevant industry specific knowledge, that the team do not already possess, such as knowledge on trends, consumer behaviour, markets, competitive products, systems, regulations, trade-flows and financial aspects. Students must acquire information by doing research (desk research and field studies). In addition, there could be a lecture on a specific industry or various industries, depending on the study program.

Third, the students should develop a business plan, and discuss the aspects that the business needs to focus on when preparing for the launch of the venture.

## Exam and assessment

To assess strategic competence, we suggest a business plan as an exam. The business plan can be developed from an idea/opportunity that the students recognize and/or could be connected to sustainable entrepreneurs/businesses that have an idea already. The students could also pitch their business model as a formative assessment and be given feedback on their business models. The pitch can for example be to stakeholders or business owners. The exam, or summative assessment, can be a presentation of the whole business plan after students have made revisions from the feedback on their business models. Students can also be evaluated on a written assessment of their business plan as a summative assessment.

## Final Reflections

This report presents our suggestion for a teaching module for sustainable entrepreneurship, and it is the second report in the TES Project. In this report we included suggestions for how to teach competences for sustainable entrepreneurship, including teaching content, learning activities, and assessment methods. The research on assessment in sustainable entrepreneurship education is still limited, and it is also difficult to measure if students develop these competencies. Our suggestions for assessment methods are therefore based on commonly used assessment methods in sustainable education and entrepreneurship education, such as written assessments, presentations, and reflection notes. Educators are free to use this module for their own teaching, either as it is, or to use parts of the module as inspiration. The WP2 report should be used with the WP3 report which is train-the-trainer guidelines on how to use tools for sustainable entrepreneurship in education.

## Reports in the TES Project

### Work Package 1 (WP1)

Schadenberg, D., Long, T., & Folmer, E. (2021). Systematic Literature Review. Report for Teaching Entrepreneurship for Sustainability (TES), Work Package 1. University of Groningen. [WP1 Output](#)

### Work Package 3 (WP3)

Fauske, I., Jakobsen, S., Larsen, J. S. K., Breivik-Meyer, M., Pyykkö, L., Rouhi, P. & Persson Fischier, U. (2023). Teaching Sustainable Entrepreneurship: Train-the-trainer guidelines, Work Package 3. R&D Report, Nord Open.

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