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ENTREPRENEURIAL PEDAGOGIES IN THE ARTS @ AARHUS UNIVERSITY
Pantelis M. Papadopoulos & Sarah Robinson

Entrepreneurial pedagogies in the Arts @ Aarhus University

Centre for Entrepreneurship and Innovation and the Centre for Teaching Development and Digital Media, Aarhus University 2015
Title:
Entrepreneurial pedagogies in the Arts @ Aarhus University

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Published by:
Centre for Entrepreneurship and Innovation and the Centre for Teaching Development and Digital Media,
Aarhus University

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1. ed.

ISBN:
978-87-7684-760-9

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1da1147290a6%29.html

This booklet provides additional inspiration to the Module on Entrepreneurial pedagogies for teachers both of
which were funded by the Centre for Entrepreneurship and Innovation and the Centre for Teaching Develop-
ment and Digital Media, Aarhus University. The booklet is published as a part of the development project "The
Entrepreneurial University", supported by the Danish Business Authority and the European Social Fund.
# Content

Entrepreneurship, entrepreneurial mind-set, and enterprising behaviour .............................................. 4  
1.1 Entrepreneurship – What is it? ........................................................................................................... 4  
1.2 Entrepreneurship in HE .................................................................................................................... 5  

Active listening and reflective questioning techniques ............................................................................. 7  
2.1 Active listening and reflective questioning - What? ........................................................................... 7  
2.2 Why use active listening and reflective questioning? ........................................................................ 8  
2.3 When is active listening and reflective questioning used? ................................................................. 9  
2.4 Why is active listening and reflective questioning useful in entrepreneurship? ............................. 9  
2.5 Who can use active listening and reflective questioning? ............................................................... 10  
2.6 How the exercises should be approached ....................................................................................... 10  
2.7 Some examples of the above exercises ........................................................................................... 16  

Collaborative learning and peer feedback ............................................................................................... 18  
3.1 Is it collaboration or cooperation? .................................................................................................... 18  
3.2 Benefits from collaborative learning .............................................................................................. 19  
3.3 Motivation models and theories ....................................................................................................... 21  
3.4 Collaboration scripts ....................................................................................................................... 25  
3.5 Peer review .................................................................................................................................... 33  

Software tools for teaching and learning ............................................................................................... 38  
4.1 Learning resources ........................................................................................................................... 39  
4.2 Production tools ............................................................................................................................... 40  
4.3 Sharing tools .................................................................................................................................... 40  
4.4 Collaboration tools ............................................................................................................................ 41  
4.5 Communication tools ....................................................................................................................... 42  
4.6 Social networks ................................................................................................................................. 42  
4.7 Assessment tools .............................................................................................................................. 43  
4.8 Integrating new tools into LMSs ...................................................................................................... 43  

Other Resources .................................................................................................................................... 44  
References .............................................................................................................................................. 45
Entrepreneurial Pedagogies in the Arts
@ AARHUS UNIVERSITY

Entrepreneurship, entrepreneurial mindset, and enterprising behaviour

The booklet presents a hands-on approach for teachers to what entrepreneurship might look like in the Arts. It provides practical examples and exercises for use in university teaching. It does not give a one-size-fits-all recipe for teaching entrepreneurship. Instead this booklet endeavours to provide a range of tools for classroom teaching that may enhance student learning and understanding of their own potential in relation to the topics they are studying.

The booklet is divided into a series of three short chapters. The first presents the background and strategies for introducing active listening and questioning techniques in the classroom. These techniques are explained and examples are given. The second presents a selection of the material available on collaborative learning and peer feedback. Finally we present and discuss the use of software tools for teaching and learning. In addition we make some suggestions for links to resources for entrepreneurship education and provide a list of references for the material mentioned in the booklet.

Before we present any tools or exercises we need to define what we mean by entrepreneurship. Over the last decade, university education has become inundated with a rhetoric that uses terms such as entrepreneurship, entrepreneurial mind-set and enterprising behaviour (Robinson & Blenker, 2014). This booklet is a response to some degree to these discourses.

1.1 Entrepreneurship – What is it?

Entrepreneurship is often simply defined as business start-up and is therefore found in political discourses where governments seek to encourage national growth. Entrepreneurship in these terms may reside within the School of Business. However, these discourses have gradually crept into all areas of university teaching. Around the end of the 1990's, there was a growth in the discourses of entrepreneurial learning in educational institutions (Rae & Wang, 2015). Before this time, entrepreneurship research and teaching had focused on what entrepreneurs do and who they were. Much of the early teaching focused on entrepreneurship has focused on two main areas, i) about entrepreneurship, which provides students with an understanding entrepreneurship theory and reproducing this knowledge, and ii) for entrepreneurship, which teaches students the tools for doing business, e.g., marketing or business modelling and testing them on this knowledge. Recently, there has been a development of other courses that require
students to simulate some of the experiences that entrepreneurs have. These courses are generally called through entrepreneurship and, although they are regarded as being more effective in terms of fostering entrepreneurship, these courses are difficult to evaluate (Pittaway & Edwards, 2012). The last form is the most difficult to put into practice in HE for a number of reasons. One major reason is the difficulty of setting up learning goals, which can be assessed, and evaluating what has been learned. Shifting away from the purely economic focus, which dominated entrepreneurship teaching and learning since the theories presented by Schumpeter (1934) and Kirzner (1973), a different movement has taken shape, one that is much broader and more socially orientated. Currently, there are discourses about environmental, medical, bio-chemical, and importantly social entrepreneurship. Entrepreneurship is not solely about starting a business, but appears to be about seeking opportunities for new products and services across a number of disciplines. The growth of interest in entrepreneurial learning has put a different spin on how entrepreneurship is taught and the goals that are envisaged. The question has been whether entrepreneurship is for particular people with particular skills and not for those who have a different skill set. Evidence shows that some people will become entrepreneurs (no matter what we do to them) and some will not.

However, entrepreneurship is not just a goal and a discipline, but can also be regarded as a method or way of working. Our point here is that there is sometimes a “fluffy” divide between the entrepreneurship discipline and entrepreneurial methods. This booklet provides suggestions for methods that will stimulate and foster what we call entrepreneurial learning. Learning in these terms begins with the individual, with a development of the individual’s own understanding of self, her competences and skills, how relationships are developed and finally a deep understanding of how she approaches problems. This book presents ways to stimulate learning that is deeply seated in the individuals own world that allows them to explore, examine, question and make sense of situations and to create value for themselves and others. This is what we will later refer to as nurturing an entrepreneurial mind-set.

1.2 Entrepreneurship in HE

In the university, we seek to equip our students with skills and competences that were first articulated in Bloom’s taxonomy (Bloom, Engelhart, Furst, et al., 1956) to remember, comprehend, apply, analyse, synthesise, and evaluate knowledge. While there have been many attempts to articulate learning, his approach still has a stronghold in HE pedagogy today. The construction of academic knowledge is often done through critique. Critique in itself can be erosive; by breaking down arguments, looking for the
gaps and holes or evidence it can often end up being de-constructive. While these are essential elements for “good” academic argument, they may result in our students being unable to see beyond a pre-conceived construction of limitations and barriers. Students are effectively schooled in this way, to think diagnostically and causally, focusing on what they know and what is possible. This method of thinking and critiquing tends to hinder creative thinking, which is what entrepreneurs are able to do. Encouraging students to work with different methods and to understand their own potential in new and different ways can be achieved by focusing on methods that are used by expert entrepreneurs. One of the basic methods is effectuation (Sarasvathy, 2001). The booklet here is informed by on-going research and teaching at Aarhus University (see PACE project http://badm.au.dk/research/research-groups/icare/pace/) where entrepreneurship is defined as creating value for oneself and others through everyday practices. For many students a university education is about getting a qualification for a job. However, more and more we are meeting students who articulate a frustration about flexibility to engage with real problems in their own lives, which maybe an explanation for the growth of areas like social and environmental entrepreneurship. The discourses that surround these ways of acting in the real world, being enterprising in your own life, have a strong appeal for students wanting more than a paper qualification for a pre-described job. We believe that we can encourage students to develop an entrepreneurial mind-set through particular ways of teaching.
Active listening and reflective questioning techniques

2.1 Active listening and reflective questioning - What?

In this chapter, we suggest that active listening and reflective questioning techniques are useful tools for nurturing creative thinking and behaviour. Inspired by two sources; Appreciative Inquiry (AI) (Cooperrider, Whitney, & Stavros, 2008) and ethnographic interviewing techniques (see for example, Sobolewski, 2009), this chapter presents a number of exercises that combine reflection and ways of working appreciatively. These techniques are helpful to students in fostering creative thinking and behaviour. These techniques focus as much on listening as they do on questioning, and can be used by anyone, in situations where people are working together, and where solutions are jointly explored. The techniques we present here may at first appear to be quite simple, but they are powerful, when used correctly (Kahane, 2007).

The combination of elements from AI and ethnographic interviewing empower through reflection listening and questioning to enhance individual learning. AI in itself is a significant strategy for learning and can easily be used in educational institutions, both by teachers and students. Made popular by Cooperrider and Srivastva (1987) in research inside organisations, the AI model has evolved for use in a range of work contexts, including Education and Health sectors. AI is also currently widely used in management and leadership programmes (Cooperrider & Whitney, 2005). The technique has been transferred to Education, where we recognise it as Collegial Supervision. While Collegial Supervision is effective for sharing of practices, it tends to focus on problem solving rather than development and growth to change practice. The original intention of AI was to focus on value and allow the participant to articulate what is of value, to envision potential value and to engage in a dialogue about how this could be achieved. It is this focus on value rather than problems that is useful in the context we refer to here. By using this method, participants are encouraged to “Discover, Dream, Design and Deploy” (Cooperrider & Whitney, 2005). This positive approach has been shown to free individuals to be creative and realise what appears to be an unconditional potential for constructing new realities. This original intention is, therefore, useful for fostering an entrepreneurial mind-set. In this chapter, we combine these ideas and intentions with techniques that are used in ethnographic interviews in edu-
cational research (see for example, Tierney, 1991; Walford, 2007). Ethnographic educational research demonstrates that if participants are positively encouraged to reflect on and articulate their own (teaching) practices, not only what failed, but also what worked (what was of value), they begin to develop a deeper understanding of what triggers learning outcomes in the classroom.

2.2 Why use active listening and reflective questioning?

In order to enhance a future orientated way of understanding and behaving in our students, we must equip them with techniques that support and empower. Encouraging this “transformative dialogue” (Gergen, 1982) opens up for new possibilities or forms of action that breaks down invisible barriers to change. Later, we describe collaborative learning as a technique, which has a focus on learning in groups. Active listening and reflective questioning are integral to collaborative work. There is therefore overlap between the format and structure of the exercises in this section and those in the following one on collaborative learning. Students who are practiced in active listening and reflective questioning techniques tend to feel empowered and achieve a deeper awareness of their skills and a broader understanding of their potential to act in the world outside the university walls. In short, these techniques enhance student learning and, when used in particular situations, will help nurture an entrepreneurial mind-set.

A number of authors have written on transformation and change in work places. However, we would like to draw your attention to one book that could provide further inspiration. De Haan’s (2006) book entitled: Learning with colleagues: An action guide for peer consultation makes explicit through examples the methods for shared enquiry and decision making that is purposeful, reflective and offers positive approaches to questioning that leads to change of practices.

The techniques we present here provide individuals with insight into their own understanding, knowledge, and expertise and also create opportunities for sharing of expertise, for genuine curiosity about practices in other knowledge domains. To practice these techniques students must be willing to break with tradition, to question routines, become aware of “usual” practices and be determined to explore and understand their own personal behaviour, traits, and preferred ways of acting. To achieve this, students have to be prepared to practice, like
training for a marathon, to develop skills and competences to explore and understand not only themselves, but their potential in the outside world.

2.3 When is active listening and reflective questioning used?

We know that teaching and learning are not always connected. What we teach is not always what is learned by the students. Given that we want to optimise student learning, we must be aware of what our intentions are when we teach. We need to align what we teach with the intended outcomes and make sure that these match with what is learned (Biggs & Tang, 2011). However, in the exercises described here, the most important outcome is that students master an understanding of their own learning. These are fundamental mechanisms to allow students to nurture and foster entrepreneurial ways of thinking and doing. Following these exercises in active listening and reflective questioning, students can begin to master personal awareness of their own competences, skills, and resources. They will be able to reflect and learn about themselves in relation to others and to the situations they meet. Real learning results in a change, a transformation if you like, where the learner thinks, behaves, and acts differently as a consequence.

The exercises described here may be recognizable from a range of disciplines currently and to some extent may be reminiscent of techniques used in mentoring, coaching and therapeutic strategies. The difference is that here these are used as pedagogical tools and it is the individual learner that controls the learning and the outcomes. In other words, it is the individual student who controls what happens and what changes as a result.

2.4 Why is active listening and reflective questioning useful in entrepreneurship?

If we agree that entrepreneurship is about creating value for the individual, then we need to find techniques that will elicit and support an awareness of value. What we value can be internally motivated, for example our personal competences and skills, or externally motivated, our relationships with other people, with nature and the environment, our attitudes to society and the way we behave as a result. For example, by being aware of available resources, or having an understanding of the extent of our personal networks. Exploration of one’s personal networks through active listening and reflective questioning can bring a new awareness about the

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Active listening and reflective questioning require students to be authentic, open, and willing to explore. It is a technique which takes us away from diagnostic thinking and allows for opportunity and possibilities.
strengths of our networks and the resources that are available to us through these. We have already mentioned that AI is about being able to discover (become aware of potential), dream (visualize other possible ways of acting), design (plan for change), and deploy (enact the change to create new value). It is these processes that can be elicited and supported through careful preparation within a particular academic domain. How far we wish our students to involve themselves in these processes is up to the teacher and students. The exercises described below are elementary and preparatory for the kind of work that comes in a period of examination and exploration – two key features in academic knowledge accumulation.

2.5 Who can use active listening and reflective questioning?

Anyone can use this technique. A skilled therapist can use this technique with a client, in guiding and assisting reflection about difficult experiences. However, as a pedagogical tool, it can be used in a whole range of situations to explore, experiment, and examine knowledge and understanding as well as to discover where routines have become restrictive, or to explore opportunities for new ways of working. It takes some practice to use it as an effective pedagogical tool to facilitate change. However, in the hands of a skilled reflective practitioner, this technique can be most effective. It requires students to be authentic, open, and willing to explore. It is a technique which takes us away from diagnostic thinking and allows for opportunity and possibilities. The facilitator who is practiced in setting up these strategies will be aware of the difficulties that participants face who rely on diagnostic methods of listening and questioning. However, for the novice facilitator and participants there are a few rules that should be made clear, before engaging in the exercises. Active listening and reflective questioning can be practiced in a number of ways. These are described in the following preparatory exercises.

2.6 How the exercises should be approached

In the following section, we present a series of exercises that are to be facilitated by the "teacher". These exercises can be used to engage participants in a range of techniques to bring awareness about how we communicate, what we communicate, and to expand and practice a repertoire of strategies for active listening and reflective questioning. There is no limit to class size here. However, there is an expectation that the participants can work in pairs and in groups of three and four and that there is a platform (either physical or virtual) for sharing a discussion (de-brief) of the work afterwards. The participants do not have to know each other beforehand, so groups can be allocated in an ad-hoc manner. Each exercise has:
• a time limit (which does not include the discussion at the end),
• rules for engagement
• roles which are allocated to the participants
• a discussion led by the facilitator with all the participants

The time limit, rules, and roles must be adhered to. The roles and the preparation for the exercise must be explained fully beforehand. The facilitator must provide a platform for and allow time for a general discussion with all the groups after the exercise is concluded. The general discussion at the end of each exercise is a debrief on the exercise; a summing up at a meta-level to talk about what was learned about the strategy that was practiced.

<table>
<thead>
<tr>
<th>Exercise 1</th>
<th>15 min.</th>
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</thead>
<tbody>
<tr>
<td><strong>Goal</strong></td>
<td>Observing body language</td>
</tr>
<tr>
<td><strong>Roles</strong></td>
<td>Four participants (2 in conversation, 2 observers)</td>
</tr>
<tr>
<td><strong>Exercise description</strong></td>
<td>Two participants have a conversation (5 min.) where one person explains an interest to the other. The two remaining participants take the role of observers. They sit at a distance from the other two and each focuses on one of the people. They observe body language relative to; positioning and mirroring in relation to the other person, the use of hands, facial expressions, mimicking, etc. Notes are made during the exercise and added to, afterwards (2 min.) The roles are then swapped.</td>
</tr>
<tr>
<td><strong>Questions for general discussion</strong></td>
<td>How do people use their bodies in conversation? Why are bodies important? When are bodies not used in conversation?</td>
</tr>
<tr>
<td><strong>Summarising the exercise</strong></td>
<td>The important part of this exercise is to make the participants aware of how they use their bodies when communicating. How do we show we are interested? How do we show we are bored? How do we try to hide the fact that we are bored? People communicate as much with their bodies as they do with words. Sometimes they communicate things with their bodies that are not made explicit in words. Heightening awareness of our own and other people’s body language makes for better communication.</td>
</tr>
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### Exercise 2

<table>
<thead>
<tr>
<th><strong>Goal</strong></th>
<th>Observing the effect of reflective listening</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Roles</strong></td>
<td>Three participants (focus person, listener, observer)</td>
</tr>
</tbody>
</table>

**Exercise description**

- **Focus person**: talk about something you are interested in for about 5 min.
- **Listener**: using your body language show interest in the topic at the beginning of the story switch to show dis-interest (boredom) and then back to interest before the end.
- **Observer**: notes what happens to the story teller – how does the story flow change, what happens to the language used.

Swap the roles.

**Questions for general discussion**

What happens when we listen reflectively? What effects can we see? Talk about the power of reflective listening – even without questioning

**Summarising the exercise**

The important part of this exercise is to make the participants aware of how they use their bodies when listening. Listening is also communication. Reflective listening will improve communication both for the speaker and the listener. Listeners can influence, to some extent, the power of the communication, the engagement, and the emotions that are linked to communicating.

N.B.: the exercise can be carried out with a large group of students where there are “volunteer” story-tellers, listeners, and observers involving the whole group in active roles. Here the discussion would focus on the power of the group to change dynamics in an interaction.

### Exercise 3

<table>
<thead>
<tr>
<th><strong>Goal</strong></th>
<th>Exploring value e.g., in an academic topic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Roles</strong></td>
<td>Two participants (one takes the role of focus per-</td>
</tr>
</tbody>
</table>

5 min. preparation - 10+5 min. each (40 min. total)
Focus person: Describe a subject/topic that you are passionate about and have broad knowledge about (you should be able to talk for about 5 min. so you both need to prepare in advance for this exercise).

Interviewer: you will practice asking open and positive questions.

e.g., I am not sure I understand ... can you explain more about that?

I think that ... is really interesting can you tell me more about that?

I am curious about ... can you say more about that?

**Exercise description**
Focus person begins (about 5 min.) explaining their topic of interest.

Interviewer makes notes – writes key words

After about 5 min. the interviewer begins to ask questions that are positive and open. The exercise concludes with the focus person summing up the new/different understanding they have of their topic resulting from the questioning. The interviewer helps them to formulate the subject area.

N.B.: If possible the interviewer should make comments about the focus person’s body language – signals of engagement or doubt

**Questions for general discussion**
What happened to the understanding of the subject area? Which questions helped expand understanding? How difficult was it to stay with this type of questioning?

**Summarising the exercise**
The exercise is the first step to practicing asking open and positive questions. This is a technique which is fundamental to active listening and reflective questioning. There will be a tendency to revert to “old” ways of questioning, which is why there are rules and time limits for this, and all exercises. This exercise is fundamental to the technique and should be repeated as often as possible in different situations. It helps enhance
<table>
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<tr>
<th>Exercise 4</th>
<th>5 min. preparation - 10+5 min. each (40 min. total)</th>
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<tbody>
<tr>
<td><strong>Goal</strong></td>
<td>Exploring value e.g., in an interest area</td>
</tr>
<tr>
<td><strong>Roles</strong></td>
<td>Three participants (one takes the role of focus person, the second of interviewer, the third of observer).</td>
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<td></td>
<td>The roles for the focus person and interviewer as the same as Exercise 3.</td>
</tr>
<tr>
<td></td>
<td>Observer: listens to what is said by the focus person and notes what questions change the way the focus person is thinking about the topic. Preparation (all): Describe a subject/topic that you are passionate about and have broad knowledge about within 4 specific areas – who, what, where, and how (you should be able to explain who is engaged in this area, what happens, where and when this happens, and how you go about it to the interviewer).</td>
</tr>
<tr>
<td><strong>Exercise description</strong></td>
<td>Focus person begins (about 5 min.) explaining their topic of interest from the four focus points.</td>
</tr>
<tr>
<td></td>
<td>Interviewer makes notes – writes key words.</td>
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<tr>
<td></td>
<td>After about 5 min. the interviewer asks questions that are positive and open. In addition, the interviewer is allowed to ask about links between different areas. At the end the observer relates back to the focus person what the observer heard and relates to both the questions that affected a change in thinking/focus. The exercise concludes with the focus person summing up the new/different understanding they have of their topic, resulting from the observer’s comments.</td>
</tr>
<tr>
<td></td>
<td>N.B.: If possible, the observer should comment on the focus person’s body language – signals of engagement or doubt.</td>
</tr>
<tr>
<td><strong>Questions for general discussion</strong></td>
<td>What happened to the understanding of the sub-</td>
</tr>
</tbody>
</table>
ject area? Which questions helped expand understanding? How difficult was it to stay with this type of questioning?

**Summarising the exercise**

The exercise is another step to practicing asking open and positive questions. The development of understanding comes from a focus on specific concepts; what, who, how, where. This is a technique that enhances exploration and examination and can be used in a range of situations. Talk about the need to give advice or recount own experience. Talk about building confidence in the strategy.

**Exercise 5**

5 min. preparation - 10+5 min. each (40 min. total)

**Goal**

Exploring networks to elicit available resources

**Roles**

Three participants (one takes the role of focus person, the second of interviewer, the third of observer).

The roles for the focus person and interviewer as the same as Exercise 3.

Observer: listens to what is said by the focus person and notes what questions change the way the focus person is thinking about the topic. Preparation (all): Individual mapping of networks – who do I know (close relationships = strong ties) and what resources do these strong ties have that I could be given access to. Secondly who do I know peripherally (weak ties) and what resources do these relationships have that I may have access to.

**Exercise description**

Focus person begins (about 5 min.) explaining their resource map beginning with strong ties and their resources.

After about 5 min. the interviewer asks questions that are positive and open. In addition, the interviewer is allowed to ask about links between resource people. At the end the observer relates back to the focus person what the observer heard and relates to both the questions that affected
changes/additions to understanding of personal resources. The exercise concludes with the focus person summing up the new/different understanding they have of their resource map resulting from the observer’s comments.

Questions for general discussion

What happened to the understanding of the available resources? Which questions helped expand understanding? How difficult was it to stay with this type of questioning?

Summarising the exercise

The exercise is another step to practicing asking open and positive questions. The development of understanding comes from a focus on specific concepts; who we know, how we establish and maintain networks/resources. This is a technique that enhances exploration and examination and can be used in a range of situations. Talk about the relationship building and networking as skills. Talk about building confidence in the strategy.

2.7 Some examples of the above exercises

Exploring potential networks (see Exercise 5):

The focus person thinks about their networks, socially and professionally. Some networks arise through interests and hobbies, some through family, some through work related activities and others through friendships. What is important here is what resources these networks have access to. For example, a family friend may work in the local government in the social work department and may have access to other people in government. All these networks should be described by the individual, first through mapping; dividing into areas such as family, friends, hobbies, work-related, etc. The structure for this can be discussed with the participants so that each individual produces their own “map of networks”. The map is then explained to the interviewer who asks questions to elicit a deeper understanding about how these links were created and where links are strong or weak.

In general the focus person will have forgotten about some links or will not be aware of the kinds of resources that are available to them, before they draw the map and have the discussion about it. Initially the drawing of the map is important to make the resource network concrete and the discussion with the interviewer should articulate a conscious awareness of the extent – breadth and depth (strong and weak ties) – of the access the participant has to particular kinds of resources.
Exploring an interest area (see Exercise 4):
The focus person is asked to think about a hobby or interest that they have. They must describe the hobby to the interviewer who questions them about it. The questions are open and positive and focus on what has been said. The interviewer will use the phrases the focus person uses. The interviewer is not allowed to talk about their own experience or to give advice. The focus must be on what is being said – active listening – and the questioning must reflect the language used and the topics mentioned.

In general the focus person learns that their area of interest has many more facets than they realise, or they may find that the area of interest is difficult to explain to someone who has no or little prior understanding of the area. They will understand how communication can be enhanced and what needs to be said to develop better understanding.
Collaborative learning and peer feedback

In this chapter, you will find information about collaborative learning and the impact of peer feedback on student learning. The chapter tries to clarify the concept of collaboration and presents why there is so much hype around terms such as collaborative learning, computer-supported collaborative learning, and peer feedback. More specifically, the chapter includes information on:

- The benefits of collaborative learning on cognitive and metacognitive levels
- Motivation models and tips on how to design engaging learning activities
- Collaboration scripts, the most commonly used scaffolding mechanisms to engage students in meaningful interactions
- The peer review method and the benefits for the teacher, the author, and the reviewer

Although the information presented in this chapter is drawn from current literature on Education research, the goal of the chapter is to reach a wider audience presenting also practical information, thus being a helpful companion or a starting point to teachers who are interested in integrating collaborative learning activities in their courses, as a way to support entrepreneurial learning.

3.1 Is it collaboration or cooperation?

In his seminal work “What do you mean by ‘collaborative learning’?”, Pierre Dillenbourg (1999) tried to shed light on what people with different background perceive as “collaborative learning”. It was, and still, is a difficult task to create a common vocabulary for researchers on Education, Psychology, and Technology. According to Dillenbourg (ibid.), collaboration does not suppress the learning mechanism of individual learning (e.g., induction, deduction, compilation, etc.), but adds to them extra learning mechanisms that occur among the people collaborating (e.g., explanation, disagreement, mutual regulation, etc.). In general, collaborative settings are symmetrical (agents have comparable range of actions, knowledge, and status), there is a common shared goal (e.g., solve a problem, reach a common understanding, etc.), division of labour, interaction among the agents, and synchronicity and is therefore useful for developing an enterprising mind-set

Very often the terms collaboration and cooperation are used interchangeably in the literature. However, a distinction could be made (and has been made, especially for
people focusing on Education). Both terms suggest some kind of labour division and interaction among the agents. However, the level of synchronicity and interaction could provide the means to distinguish the two. Cooperation refers to situations where the partners are dividing the workload and act individually on sub-tasks, and interaction comes later when the separate parts are combined to assemble the final output.

Cooperation is more appropriate for business contexts, where two companies work together on the same product, but have their own processes and methods while working on parts of the product. In contrast, collaboration refers to settings where partners work together. Some division of labour and role assuming could still occur in collaboration, however, the difference lies on the high level of interaction between the partners and, often, the synchronicity of their communication.

3.2 Benefits from collaborative learning

So, the question that the reader may ask at this point is whether collaborative learning works and how. What are the benefits and the shortcomings of this approach? Is it easy to implement? What are the resources needed (also including the instructor’s time to plan, manage, and assess a collaborative learning activity)? The short answer would be that as in any other educational approach, the efficiency and effectiveness of the method depends on the rigorousness and elegance of the instructional design the teacher chooses to apply in a specific didactical context.

There is a huge volume of literature providing evidence of the beneficial impact of different types of collaborative learning to students in both cognitive and metacognitive level. For example, the interaction facilitated through collaborative learning provides the opportunity to the students to further articulate and explain their thoughts and even modify their initial position in response to feedback from peers (Berge & Collins, 1995). Through collaboration, students get the chance to further develop their problem solving, communication, and self-regulation skills (among others), and improve their knowledge construction activities and learning performance (Littleton & Häkkinen, 1999; Chou & Tsai, 2002; Tsai, 2001; Ben-Ari & Kedem-Froedroch, 2000; Pear & Crone-Tood, 2002).

However, researchers have repeatedly emphasized that collaborating students may fail to engage in productive learning interactions when left without teachers’ consistent
support and scaffolding (e.g., Dillenbourg, 2002; Barron, 2003; Papadopoulos, Demetriadis, & Stamelos, 2009). Collaborative learning may often result to detrimental learning due to student failure to collaborate effectively. Productive learning interactions do not happen spontaneously within the team and research has consistently revealed that freely collaborating students may lack the competence to engage in fruitful learning interactions without external support and guidance (Liu & Tsai, 2008). This needs to be underlined and emphasized, as in many cases the instructional design applied by the teacher ends in grouping the students into teams. Meaningful collaboration requires a combination of skills such as communication, clarification, negotiation, monitoring, and regulation, along with a group of motivated and engaged students.

So, the three questions an interested reader should ask before applying collaborative learning in a course are:

- Are the students aware of the possible benefits of collaborative learning?
- Are the students willing to actively participate in collaborative activities?
- Do they know how/are they capable to do so effectively/efficiently?

Most students have some experience, one way or another, on collaborative learning. However, one should agree that the opinions towards collaboration could differ significantly. One reason is the students may not know or capable to understand how engaging in collaborative activities could be useful for them. The potential of collaborative learning should become explicit. Hopefully, this would help students to be more aware of the process and evaluate the learning experience more positively.

The second question refers to students’ motives for active participation in the activity. Do they like the activity? Do they find it interesting or relevant to their own goals? Do they think is easy or hard to successfully complete it? How their peers affect their motivation? Superficial engagement could hinder the outcome of any learning activity. As such, the instructional designer should first understand how motives affect students and then how instructional design can take into account students’ motives for participation. The third question refers to students’ cognitive and metacognitive skills, related to collaboration and the scaffolding method the teacher is going to offer. In other words, the students may be highly engaged into the collaborative activity, but fail to apply methods and strategies that would allow them to get the most out of their experience.

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*Students’ motivation for engagement in a learning activity is high when the activity has a personal value to them and when they can expect success.*
3.3 Motivation models and theories

This section presents three models regarding students’ motivation and suggestions on how to integrate the knowledge about motivation into the instructional design of an activity. The purpose of presenting three different approaches is to offer somewhat different perspectives on this topic. Designing engaging activities is a hard task in itself and the teacher should follow what fits best in a specific context. For example, what is the distribution of deep and surface learners in the class? Are students competitive or community oriented? Are they experienced or novice learners? Questions like these focus on the context in which learning takes places and can strongly affect what we consider as an appropriate instructional design.

3.3.1 Biggs and Tang’s model

According to Biggs and Tang (2011), students’ motivation for engagement in a learning activity is high when the activity has a personal value to them and when they can expect success. The connection to personal value is one reason for including these exercises here. Their model suggests four types of motives:

<table>
<thead>
<tr>
<th>Biggs and Tang’s model</th>
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<tbody>
<tr>
<td><strong>Extrinsic</strong></td>
</tr>
<tr>
<td>These are the motives set usually by the instructor, the situation, or the organization. Receiving a passing grade for successfully completing a task is an extrinsic motive. Similarly the fear of punishment from failing into a task is also an extrinsic motive. In other words, usually this type of motivation is easy to identify and measure and is offered (or inflicted) to the students by someone else. Not surprisingly, it is also the type of motivation with the least impact on students. Not to be confused, a student enrolled in a course, is expected to want to pass the course, however, this does not necessarily means deeper engagement. It is common to have unmotivated students meet the minimum requirements of the course in order to pass and instantly forget it. Deeper motivation is needed for active participation and for productive collaborative learning.</td>
</tr>
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</table>

| **Social**             |
| This type of motivation refers to students’ desire to receive social acknowledgement. In other words, the student is trying to please others (peers, teacher, family, etc.) in order to get their approval. Similarly, the student could also be motivated to meet the standards set by a role model. These motives are generated from within and it is up to the teacher to identify the dominant culture in the class. Is there a strong feeling among the students of belonging in a group or personal success comes first? |

| **Achievement**        |
| This type of motivation also comes within and could be seen as opposite to the social motives. According to achievement motives, students are engaged |
in an effort to enhance their ego. In other words, the student is not motivated to reach others in the group but to beat them and get ahead. The competitive nature of this type of motivation could have beneficial effects for individual learning, but could also be detrimental for collaborative settings.

Intrinsic

Intrinsic motivation comes from the genuine love and interest of the subject matter. The student is engaged into an activity, not because of an external reward, or because others like the activity too, but because of an intellectual pleasure. This is usually the most powerful, but also the most difficult to generate, motive.

3.3.2 Ambrose et al. model

Ambrose, Bridges, DiPietro, et al. (2010) suggest a similar approach, categorising motivation types in more detail. Their view extends Biggs and Tang’s, stating that motivation refers to the personal investment that an individual has, in reaching a desired state or outcome. This model suggests five types of motives:

<table>
<thead>
<tr>
<th>Ambrose et al. model</th>
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<tbody>
<tr>
<td><strong>Performance</strong></td>
</tr>
<tr>
<td><strong>Work-avoidant</strong></td>
</tr>
<tr>
<td><strong>Affective</strong></td>
</tr>
<tr>
<td><strong>Social</strong></td>
</tr>
<tr>
<td><strong>Learning</strong></td>
</tr>
</tbody>
</table>
Both models suggest that students’ motivation is based on personal values and expectations in search of certain goals. Although it is expected that students’ and teachers’ goals will not always be aligned, the models suggest that the task for the teacher should be to influence students’ goals by influencing the values and expectations of the activity. While an activity that satisfies more than one goal increases motivation, conflicting goals between the teacher and the students lower engagement. In addition, broadening the scope of an activity in order to satisfy domain-independent goals, such as skills and competences development that could be used in other domains, could also enhance motivation.

### 3.3.3 Keller’s ARCS model for motivational design

While the last two models approach motivation from a theoretical point of view, trying to identify the nature and source of students’ motives, Keller’s ARCS model (2010) provide a more practical approach, assisting the teacher into designing engaging activities. In the model, “motivation” refers to factors of the learning situation that make students activate their cognitive processes to accomplish the objectives of the activity. According to the ARCS model, four critical factors are related to motivation:

<table>
<thead>
<tr>
<th>Keller’s ARCS model</th>
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<tbody>
<tr>
<td><strong>Attention</strong></td>
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<tr>
<td>A learning activity should gain and keep students’ attention high. According to Keller, attention could be gained in two ways, namely, perceptual, and inquiry arousal. Perceptual arousal refers to the use of surprising, novel, incongruous ways of introducing students into the activity, while inquiry arousal refers to the stimulation of curiosity and the use of challenging questions and problems to be solved. There are many ways for grabbing students’ attention from the start and one has to be imaginative. For example, roleplaying, humour, devil’s advocate approach, real world examples, anecdotes, etc. could be used in this direction. Getting students interesting from the start is important, because it could be harder to engage students into an activity, after they decided that the topic does not interest them. However, attention alone is not enough to retain high levels of student engagement throughout the activity. The next three factors should also be considered.</td>
</tr>
<tr>
<td><strong>Relevance</strong></td>
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<tr>
<td>The students should clearly understand how the completion of a learning activity will help them in achieving their personal goals. Once again, the role of personal goals appears in a motivation model. If the students realize that the activity goals are in line with their own, they will have an internal drive to participate. Keller suggests six major strategies to help students appreciate the value of an activity: (a) experience: clarify the link of how existing knowledge and skills could be applied in the activity, (b) present worth: identify the immediate benefits of the activity, (c) future usefulness: identify the future benefits of the activity, (d) needs matching: communicate with stu-</td>
</tr>
</tbody>
</table>
dents to better align their goals with the activity, (e) modelling: be an example of what you want the students to become, and (f) choice: allow different options to the students to control and own their learning.

**Confidence**

Students should have a clear understanding of what it is expected from them and how likely is the chance of successful completion of the activity. An activity that looks too hard to complete, seems vague, or with unclear metrics of success is more likely to discourage students. Keller suggests three strategies for building students’ confidence: (a) performance requirements: students should be provided with assessment guidelines and evaluation criteria to be able to independently and accurately estimate the amount of effort needed, (b) success opportunities: students should have the chance to complete the activity by following multiple, varied, and challenging experiences that are manageable and build upon one another, and (c) personal control: allowing control over the activity gives the students the feeling that they are responsible for their success.

**Satisfaction**

Students should feel that their participation in the activity is rewarding or satisfying, whether this satisfaction comes from achievement or praise. The three main strategies to promote satisfaction, according to Keller, are: (a) intrinsic reinforcement: encourage pleasure of learning for its own sake; in other words, support intrinsic enjoyment of the learning experience, (b) extrinsic rewards: this refers to rewards such as positive reinforcement, motivational feedback, certificate/grade award, etc., and (c) equity: maintain the assessment criteria and provide evaluative feedback accordingly; in other words, keep standards high and avoid patronizing the students through over-rewarding easy tasks.

The three motivation models presented provide different approaches on how to design activities that would enhance students’ engagement. But, as it was mentioned, having engaged students can get you part of the way. In order for students to able to reap the benefit of collaborative learning, they need to be supported and guided to develop awareness of their cognitive and metacognitive skills.
3.4 Collaboration scripts

It has been already mentioned and it needs to be emphasized again: productive learning interactions do NOT happen spontaneously within a group! Assigning group work is not enough to claim that you have integrated collaborative learning in your teaching. Do you and your students share the same idea of what collaboration is? One could argue that collaboration occurs when each partner has put in the same amount of effort. However, as we have seen so far, this definition is incomplete and erroneous. How do you make sure that students will participate equally and meaningful in an activity? Are they capable of distributing work, communicate, and build upon each other’s contributions? In this section, we will focus on instructional design and collaborative learning, hopefully, giving you practical information on how you can orchestrate such activities in your courses.

To increase the probability that team partners will collaborate efficiently it has been suggested to guide the activity using “collaboration scripts” (e.g., O’Donnell & Dansereau, 1992). A collaboration script is a teacher-provided didactic scenario designed to engage a team of students in essential knowledge-generating interactions by providing guidelines on how to organize the collaborative learning activity. Consequently, “scripted collaboration” is the practice of actually implementing a collaboration script to have students work within the scaffolding framework provided by the teacher. It is suggested that by implementing an appropriate collaboration script one increases the probability of productive student-student and student-teacher learning interactions. Indeed, scripted collaborative learning has been reportedly resulted in improved learning outcomes (Kollar, Fischer & Slotta, 2005; Rummel & Spada, 2007; Weinberger, Fischer & Mandl, 2002) and has been widely used in numerous domains.

Collaboration scripts could be applied with or without the use of technology, can support different learning goals, and are domain-independent, thus making them a powerful tool for instructional design. You may have used them already, but let’s see them closer.
3.4.1 Components of a collaboration script

According to Kollar, Fischer, and Hesse (2006) a collaboration script has at least five components: learning objectives, type of activities, sequencing, role distribution, and type of representation. One needs to define all these components to design a meaningful collaboration script.

Learning objectives
The first thing you need to clarify in a script is the main purpose of the collaborative learning activity. Is it for the students to acquire some domain specific knowledge, or are you aiming at supporting them in developing their skills (e.g., argumentation, reviewing, communication, etc.)? Either way, this is the first step in the design process.

Type of activities
Next, you need to define what you want your students to actually do. Do they need to read and discuss? Do they need to write down something? Perform or demonstrate a skill? Of course, the type of activities must be aligned with the learning objectives of the previous step. If, for example, you wish that the students are going to learn how to analyse peer work and provide useful feedback, you need to engage them at some point in the activity into a peer review process.

Sequencing
It is expected that a collaborative activity will be compiled by a sequence of steps or phases. In the collaboration script, you need to define how students proceed from one phase to the next. Do they need to upload a deliverable? Are they going to decide on their own (e.g., when they reach a consensus)? Are you going to decide when they are ready to proceed (e.g., after they have spent a considerable amount of time on a task)? The number of steps in a script depends on the type of activities and the learning objectives of your context. For example, as we will present later, a collaborative activity evolved around a peer review process usually has four phases: creation of initial work, assigning reviewers, feedback generation, and revision. Once again, the number of phases you are going to implement is up to you.

Role distribution
Role distribution is very important and it is often overlooked. Dillenbourg (1999) notes the need for symmetry in collaborative learning, but this does not mean that every student assumes the same role. What it actually means is that all students should have the opportunity at some point to play all defined roles. If left alone, students usually identify on their own the roles needed, and they proceed by assuming roles according to learning goals, personal traits, or estimated workload. As with AI linking roles with the models of motivation we presented earlier, it is more useful for students to know
the roles involved in an activity and the requirements for each role. On top of that, it is preferable if you also define the role distribution, giving all students the chance to go through all roles. Presenting an example for the peer review section that follows, one could implement a collaborative activity around peer review, defining the roles of author and reviewing and having all students play the role of the author in one phase and the role of the reviewer in the next.

Type of representation
The last component of designing a collaboration script is the type of representation. In other words, how is the script going to be presented and materialized? In its simplest form, a script could be a set of oral instructions you give to the students during class time. Alternatively, a script could be printed on a piece of paper, demonstrated by the teacher, or implemented through technology. The latter is the most complex, resource demanding, but probably also most elaborate type of representation. In this case, a software tool is usually responsible for managing and monitoring the collaborative activity, allowing the teacher to sit back and assume only the orchestrating role.

3.4.2 Over-scripting, under-scripting, and scripting levels
Even though the script provides a scaffolding framework, there is still the question of how much support is enough support. The term “under-scripting” refers to settings where too little guidance is given. In these cases, there is usually unproductive learning interactions and superficial processing of content material (Weinberger, 2011). Under-scripting could also mean low coercion and the ability for students to interpret the script instruction in several ways. As we will see later, script appropriation by the students should be expected. However, there are several factors that affect the effectiveness of a collaboration script. Under-scripting usually allows students to take shortcuts and reach the end of the script without going through what the teacher was intent them to go. An example of this is when the students are asked to discussed until they reach a consensus. If no other information on how discussion should occur and how each student should participate, then it could be possible that low engaged students or students with low metacognitive skills will reach consensus quickly, by avoiding friction or clash, or by allowing interpersonal relationships to dominate their interactions.

On the other hand, there is the issue of “over-scripting”. As Dillenbourg (2002) points out, over-scripting is the danger of restricting the creativeness of free (non-scripted) collaborative settings in favour of a teacher-led guidance of collaborative activity that is promoted by the scripting approach. Over- and under-scripting are the two extremes and the advice to the reader is to be sensible and design collaboration scripts for the
specific audience, while also apply the methods described in the previous chapter and reflect on prior experience.

Finally, there are two levels of collaboration scripts: macro and micro. Macro-scripting refers to organizing the learning activity in a higher level. The focus is on a pedagogical model that shows the tasks students have to carry out. On the contrary, micro-scripting is about further organizing a task of the collaboration activity. The two levels can coexist in a collaboration script, with micro-script being the first to be faded out as students become more experience. For example, a macro-script in peer review could guide students in creating initial work, select peer work to review, provide their feedback, and revise their initial work according to the feedback they received. A micro-script on the review task could further explain how to review one another, what are the reviewing criteria, how to provide useful feedback, and so on.

3.4.3 Ideal, external, internal, and actual scripts

A script is, typically, conceived by an instructor as a helpful tool that will engage the team of students in meaningful learning. However, once it leaves the teacher’s mind it becomes a socio-cognitive entity which, not only may affect student learning in ways unforeseen by the teacher (for example by restricting natural collaboration; see Dillenbourg, 2002), but it might also be affected by students during the process of filtering and modifying the script within their own context (Tchounikine, 2007). Students’ self-organization process interacts with the script framework during collaboration. Tchounikine (2007, p.249) defines students’ “self-organization” as “the meta-level activity that a group of learners engaged in a CSCL script may engage in so as to maintain, within the reference frame that is externally defined by the script, a more-or-less stable pattern of collective arrangement”. Although, in scripted collaboration, the script prescribes to a great extent the conditions for collaboration, students’ self-organization is expected to emerge and play an important role whenever the script allows (and perhaps encourages) them to take their own decisions for organizing the collaboration. Dillenbourg (2004) underlines this distinction suggesting that one should distinguish between ideal, external, internal, and actual script, in order to conceptualize the different teacher’s and students’ script perspectives.
The ideal script is the mental representation of the script in teacher’s mind. It is how the teacher conceptualizes the intended student interaction and activity steps. It is up to the teacher to present accurately the ideal script to the students.

The external script is the version of ideal script as it is presented through different types of representations, tools, etc. to the students. It is the externalization of the ideal script. The goal for the teacher is to have the distance between ideal and external script as small as possible. It is up to the teacher to decide how the ideal script could be better presented to the specific student audience. Sometimes, oral or written instructions are enough, while in other cases, demonstrations and examples are necessary.

The internal script is actually how the students perceive the instructions of the external script. As mentioned above, students are going to pass teacher’s instructions through their own goals, affected by personal goals and objectives.

The actual script is the sum of the actual tasks and interactions the students engage in during the execution of the script. It is often the case that even the internal and the actual script have differences. Especially in the case where students have to act as a group, the actual script is the result of how the different internal scripts of the partners are materialized.

So, as it was mentioned, the distance between what the teacher prescribes (external script) and what the students are doing (actual script) should be expected. Interestingly though, this distance should not be interpreted necessarily as instructor’s design flaw but as a characteristic inherent in the teaching/learning process (Tchounikine, 2011). The distance “is not a dysfunction of the learner rather than intrinsic to the notion of task and human activity” (Tchounikine, 2011, p. 36). Likewise, it can be considered an inherent characteristic of external scripts to be interpreted and hence, distance between external and actually emerging script does not indicate a failure of the treatment. The way the distance affects the learning outcome is closely connected to the learning goals of an activity. In some cases, the teacher may expect the students to take initiative and filter the script instructions to a high degree, thus resulting to a big distance between external and actual scripts, while in other cases, following the script guidelines could be important to successfully complete an activity. The suggestion to the reader is not,
of course, that “anything goes”, but rather that in designing a collaborative activity, one should be aware of this distance and integrate it in the activity.

3.4.4 Factors affecting the external-actual script distance

So, the question that should come natural at this point is what affects the distance between external and actual scripts and how the teacher could better design an activity. There are several script characteristics that affect this distance (Dillenbourg, 2004; Kollar, Fischer, & Hesse, 2006). However, the three most central ones are intelligibility, fitness between internal and external scripts, and degree of coercion.

Intelligibility

Even with increased guidance, students are not always able to construct an accurate mental script of a very complex activity. One central aspect is therefore the extent to which learners can make sense of how a script is represented, both with respect to how well they understand what the script suggests as well as regarding the extent to which learners accept the script suggestions.

Fitness between internal and external scripts

Roles and activities assigned to students should be appropriate for them in terms of abilities, skills, and goals and should not conflict with internally represented roles. Low fitness may lead to low adoption of and adherence to roles.

Degree of coercion

Scripts vary with respect to the degree of coercion they impose on learners. Typically, scripts provide suggestions to ask critical questions, construct warranted claims, or focus on specific aspects of a task. Scripts may however, also fully control learners’ actions, e.g., by controlling turn taking and regulating who may contribute to a task at a given time. Beers, Kirschner, and Boschuizen (2007) investigated a tool that forced learners with more or less coercion to make their individual perspective explicit to others so that common ground could be negotiated. Their analysis showed that coercion increased negotiation of common ground.

3.4.5 Script examples

In the literature, you can find several types of scripts used in different situations. You can refer to these as script types, families, or categories. In the following, we will present two major types of scripts along with one example for each type. Both of them are used in various situations in the Danish context.
The SWISH model

Dillenbourg and his Swiss team (Dillenbourg & Jermann, 2007) defined SWISH, a major type of scripts, by claiming that collaboration could be the remedy to bridge carefully teacher-created gaps. Very often when students are asked (or forced) to collaborate and reach a consensus, they tend to skip the discussion ahead, spending little time in providing rigorous arguments or going against one another. On the contrary, students, especially disengaged ones, avoid conflict with their peers or opt for cooperation situations with limited interaction. If you have taught long enough, you should have also come across cases in which more engaged or high achieving students take charge of the workload, allowing others to sit back. These are the situations that the SWISH tries to address. SWISH is the acronym for Split When Interaction Should Happen and the main premise for the instructional designer is that tasks, roles, and content in a collaborative activity should be distributed in such a way that it would be impossible for a student to proceed, without meaningfully interacting with others. A typical and widely used example of the SWISH model is applied in the Jigsaw script.

**Description of the Jigsaw script**

| **Learning objectives** | The main learning objective of the Jigsaw script is usually to give multiple perspectives to the students or make sure that the students will cover the whole material, peer tutoring each other. Domain independent learning objectives also include the development of argumentation and presentation skills. You can define your own set of learning objectives, modifying the script to your needs. |
| **Type of activities** | In the Jigsaw, the students are usually asked to read material. If development of a product is necessary, it happens in a later phase of the script. This type of script could be used both for short in-class activities and for longer activities that could span days or weeks. |
| **Sequencing** | During the first phase, the students are distributed to “expert groups”. Each group (e.g., containing 4 students) is given a different set of course material to study. In this way, each group in the class eventually becomes “expert” in one (or some) of the issues affecting a bigger problem/situation. During the second phase, “mixed groups” are formed with one student from each expert group. So, now we have a group of students that have a different perspective on the same problem. In this phase, students should start working on the problem, bringing into the table what each student discussed earlier in the respective expert groups. The input of each student is necessary to tackle the problem. The two phases could be repeated with new rounds of expert/mixed groups. This description refers to the macro-script, while the detailed way in which is student informs the others on the expert’s group view is... |
part of the micro-script. For example, it could be a short oral presentation, a written abstract, a demonstration, etc.

<table>
<thead>
<tr>
<th>Role distribution</th>
<th>All students play the role of the discussant, although additional roles may be added in the micro-script level (e.g., group coordinator, presenter, etc.)</th>
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</thead>
</table>

| Type of representation | In case of an in-class activity, it is useful to have some type of coding (e.g., coloured papers) denoting the identity of each student/group. In longer, more complex, activities, software tools like learning management systems, blogs, and wikis could be used to define the working space of groups. |

**The Pyramid model (aka Snowball)**

In the pyramid-like collaboration scripts, students usually start working individually (reading material, or performing problem-solving tasks), and then participate in groups of gradually increasing size.

Pyramid scripts have been used in AU to engage students in working collaboratively and reaching a common ground. An example of a pyramid model is the Think-Pair-Share collaboration script.

<table>
<thead>
<tr>
<th>Description of the Think-Pair-Share script</th>
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<tbody>
<tr>
<td><strong>Learning objectives</strong></td>
</tr>
<tr>
<td><strong>Type of activities</strong></td>
</tr>
<tr>
<td><strong>Sequencing</strong></td>
</tr>
</tbody>
</table>
with a wider audience. In case of a small class, the wider audience could be the whole class. Otherwise, the teacher may decide to have groups of pairs, before opening up the discussion for the whole class. For example, “form a group with the two pairs sitting closest to you and take 3’ discussing the list of characteristics you came up as pairs”. abstract, a demonstration, etc.

**Role distribution**
All students play the role of the discussant, although additional roles may be added in the micro-script level (e.g., group coordinator, presenter, etc.)

**Type of representation**
Applying the script in the classroom could be easy and can be done using only oral instruction. Students should, however, make their thinking explicit by writing down their individual/pair/group opinions. The reason for this is that writing down their thoughts helps students clarify their thoughts to themselves and to others and provide a concrete point of departure for the discussion (Papadopoulos, Demetriadis, & Weinberger, 2013). In longer, more complex, activities, software tools like learning management systems, blogs, and wikis could be used to define the working space of pairs and groups.

### 3.5 Peer review

Peer feedback could refer to peer review or peer assessment. There is a fundamental difference between the two. Peer assessment refers to the activity of summative assessing student/group performance in relation to a group task. On the other hand, peer review is different mainly because it includes a “peer revision” phase, that is, a phase where students revise their drafts based on their peer review suggestions (Cho & MacArthur, 2010). In this section, we will focus on the latter because it allows for more flexibility and provides additional benefits to both teachers and students.

#### 3.5.1 Benefits of peer reviewing

Peer review is a widely used instructional approach that has been proven valuable for assisting students in both the acquisition of domain-specific knowledge and the development of domain-independent skills. McConnell (2001) argues that peer reviewing offers to students the opportunity for a constructive and collaborative learning experience, by engaging them in an active learning exercise. In its most common form, peer review entails four steps orchestrated by a teacher: (a) production of the initial student work, (b) assigning of reviewers, (c) feedback production, and (d) revisions. We include peer review in this booklet as it adds an important pedagogical dimension to developing an entrepreneurial mind-set.
The method is associated with higher-level learning skills, such as synthesis, analysis, and evaluation (Anderson & Krathwohl, 2001) as the students have the opportunity to analyse and evaluate peer work. Scardamalia and Bereiter (1994) have provided evidence that higher cognitive processes of learning are stimulated and guided by the peer review procedure, by implementing the method into school classes. The feedback provided through peer reviewing could be of greater quantity than the one provided by a busy instructor (Silva & Moreira, 2003; Wolfe, 2004), while the process of analysing peer work can support the development of students’ self-evaluation skills (Davies & Berrow, 1998), and improve their attitudes and self-efficacy (Anewalt, 2005). In other words, the peer review method could be used to help teacher provide valuable feedback to a large class. What literature suggests is that the reviews students provide can have a positive impact on learning and although students may differ in grading peer work (students tend to be either way harsher or more generous than the teachers) they will be able to provide a synthesized picture of which peer work is of high quality and which needs revisions. Lastly, in case students’ activity in a peer review process is graded, then a practical advice would be to grade students on their reviewing skills and on the final version of their work and not on the grades/comments they will receive from their peers in the feedback production phase. This will make the review process more meaningful and will lower the chances of every student getting a perfect score.

The literature abounds with relevant studies indicating that the method is popular among teachers inspired mainly by the constructivist and socio-constructivist paradigms for learning who want to challenge their students to think critically, synthesize information, and communicate science in nontechnical language (e.g., Falchikov, 2001; Liu & Tsai, 2005; Topping, 1998). The method has been used extensively in various fields such as second language writing (Hansen & Liu, 2005; Lundstrom & Baker, 2009; Rouhi & Azazian, 2013), writing instruction and relevant courses at the college level (Haswell, 2005), statistics (Goldin & Ashley, 2011), psychology (Cho & MacArthur, 2010), and computer science (Liou & Peng, 2009; Luxton-Reilly, 2009).

In a recent study (Papadopoulos, Lagkas, & Demetriadis, 2015, forthcoming), we argue that in peer review settings, in which an individual plays both the roles of reviewer and reviewee, a student receives two types of feedback, extrinsic and intrinsic:
The issue of extrinsic/intrinsic feedback requires further research. However, there are a few studies providing evidence that students that act only as “givers” (just reviewers – only intrinsic feedback) outperform students that act only as “receivers” (just reviewers – only extrinsic feedback) (Lundstorm & Baker, 2009; Rouhi & Azizian, 2013). In other words, when designing a collaborative learning activity around peer review, one has to also consider the benefits students get by the task of studying and analysing what their peers said.

### 3.5.2 Peer review phases

This section elaborates further the expected benefits, the open questions, and the research evidence for each peer review phase (Papadopoulos, Lagkas, & Demetriadis, 2012).

<table>
<thead>
<tr>
<th>Peer Review Phases</th>
<th>Description: Each student/group is assigned the development of a specific work. The definition of the production tasks and the type of student work (e.g., written, oral, product) are up to the teacher. Benefits: Students are asked to elaborate on domain knowledge. Questions: There are no specific research questions at this phase. Students may work in different ways depending on the domain and the learning goals. Peer review requires initial student work, but it is not affected by how this work is produced. Evidence: Not applicable for this phase.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Production of initial student work</strong></td>
<td>Description: The initial student work is assigned to reviewers. Benefits: The review assignment protocol should maximize cognitive and metacognitive benefits expected from subsequent peer review phases.</td>
</tr>
</tbody>
</table>
Questions: Is there a preferred review assignment protocol? For example, is it more beneficial to assign reviews randomly in pairs, freely, or matched (Van den Berg, Admiraal, & Pilot, 2006; Gielen, Peeters, Dochy et al., 2010)? What are the benefits emerging from the number of peer reviewers (i.e., comparing a single versus multiple peer reviewers) (Cho & Schunn, 2007).

Evidence: Some studies suggest matching peers (author – reviewer) depending on the level of their skills (Crespo, Parodi, & Kloos, 2004). Also, in systems, such as PeerWise and curriculearn, where the number of reviews a student can perform is not limited, students with higher grades tend to contribute more than weaker students, resulting in a greater amount of higher quality feedback being produced (Luxton-Reilly, 2009). Similarly, students that perform more peer reviews develop a more positive attitude towards the learning activity and acquired higher level of domain conceptual knowledge (Papadopoulos et al., 2012).

### Feedback production

**Description:** Student reviewers are guided to provide reviews/feedback.

**Benefits:** Student reviewers are provided with review guidelines, therefore they elaborate on domain-general knowledge/skills of peer review method. In addition, they are guided to elaborate on the domain-specific knowledge.

**Questions:** What is the impact on learning of tasks for preparing reviewers, including: (a) training of peer reviewers in reviewing skills (Sluijsmans, Brand-Gruwel, & Van Merriënboer, 2002), (b) teaching students how to provide peer feedback (Van Steendam, Rijlaarsdam, Sercu et al., 2010)? How the feedback quality affects learning (Van den Berg et al., 2006)?

**Evidence:** The literature suggests that in order for students to successfully carry out an assessment of their peers they need to be prepared for the assessment (Loddington, Wilkinson, Bates et al., 2008). In addition, the quality of peer feedback can affect its impact, with lower quality feedback having diminished impact (Gielen et al., 2010). And finally, comparisons between “givers” and “receivers” showed that the “givers”, who focused solely on reviewing peers’ writing, made more significant gains in their own learning than did the “receivers”, who focused solely on how to use peer feedback (Lundstrom & Baker, 2009; Li, Liu & Steckelberg, 2010).

### Revisions

**Description:** Author students/groups are asked to revise their work based on peer reviews/feedback.

**Benefits:** Cognitive: Student authors elaborate on the domain by engaging in revision activity. Metacognitive: Student authors reflect on the quality of their initial work and their peer reviews/feedback.

**Questions:** Are revisions improved – and how – based on the peer provided review/feedback?

**Evidence:** Students receiving feedback from multiple peers im-
prove their learning more than students receiving feedback from a single expert (Cho & Schunn, 2007). Similarly, students that provided more reviews outperformed students that provided a small number of reviews.

Peer review provides formative feedback to students, since it allows students to revise their initial work. Formative feedback is important to the exploration and examination of domain areas. A learning activity could include several peer review cycles, in which the revised work of one cycle is the initial work of the next. In these situations, and in settings where the timeframe permits, teachers could also ask the students to provide “backward feedback”. That is, to evaluate the usefulness of the review comments they received. The role of backward feedback is to inform the reviewer students on the quality of their reviews, and, hopefully, improve their reviewing skills.

Based on the above, the research evidence found in the literature suggests that settings that allow students to review a higher number of peer work hold more benefits for both for reviewers and authors.

Peer review requires a significant volume of information exchange and may pose a difficult administrative overhead for the instructor, especially when there is no available tool that can alleviate this overhead. Arguably, the simplest way to deal with this additional workload is to opt for assigned-pairs setting, in which the instructor groups students into author-reviewer pairs. Students play only one or both roles reviewing each other’s work and the whole process is easily managed and monitored. The shortcoming of this approach is the limited opportunities for the reviewer to see different perspectives and analyse her reviewing skills and for the author to receive feedback from difference sources. Luckily, there are several tools a teacher can use to allow higher number of reviews per student. On one hand, there are tools specifically designed to support peer review processes (e.g., PeerWise and curriculearn), and on the other hand there are general-purpose tools such as Google Docs that could be used to allow students exchange information and review one another. A short presentation of useful tools is provided in the next chapter.
Software tools for teaching and learning

Technology can be integrated in many different ways into an entrepreneurial learning setting. From educational technology that is designed for specific educational purposes, to ICT tools like the Internet, to digital media, technology can address a range of learning/instructional needs. For example, technology can facilitate individual or collaborative activities, improve the production of student work, make communication easier and more direct, boost visibility and knowledge sharing, and enhance reflection. In this chapter, we present a list of commonly used tools, organized into seven categories, according to the learning needs they address:

1. Learning resources: supporting study and reflection.
2. Production/creation tools: supporting independent work and construction of ideas and products.
3. Sharing tools: supporting distribution of materials, products, and ideas over the web.
5. Communication tools: supporting dialogue between students (and teachers).
6. Social networks: increasing visibility and connectivity between students (and teachers).

Of course, some of the tools may belong to more than one category. For example, a wiki may be used as the tool for creating a product (e.g., an article on a topic), while at the same time may be used as a vehicle for student collaboration. As such, the following list may be re-organized according to the reader’s perspective. Similarly, a tool may be used in different ways for teaching or learning. For example, while Wikipedia could be used a learning resource to complement course material, asking students to edit or create Wikipedia entries could be used as a course assignment. Similarly, using YouTube videos in a lecture could increase students’ engagement, while creating a video presentation could be used as course assignment for students.

All of the tools mentioned here are either free, commonly available, or under license for AU members.
4.1 Learning resources

Learning resources can be used by students to construct knowledge. In other words, learning resources should be seen as information depositories and not as knowledge providers, as students are still expected to be responsible for constructing their own knowledge. Yet these learning resources are often used in ways that restrict and hinder opportunities for co-creation, co-construction and re-contextualising knowledge and learning. They could be regarded as frameworks that allow a much broader learning forum. Learning resources should be organized, however, with the purpose of study and reflection in mind, being also able to support different learning activities.

<table>
<thead>
<tr>
<th>Learning resources</th>
<th>Description</th>
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<tbody>
<tr>
<td>Thematic collection</td>
<td>A thematic collection is a set of resources organized in meaningful themes. For example, a website on Danish history (<a href="http://danmarkshistorien.dk">danmarkshistorien.dk</a>) could present historical material based on themes such as: great speeches, Danish history in films, the history of Denmark in European Union, and so on. Similarly, a thematic collection of a director could present his work according to the societal themes he focused on, the medium and methods he used, the events of his personal life, etc.</td>
</tr>
<tr>
<td>Digital library</td>
<td>A digital library could also be seen as learning resource, although the thematic commentary is not present. Students may still apply their own search criteria and filters to get information that would be more relevant to their learning activity. In addition, digital websites, such as <a href="http://sciencedirect.com">sciencedirect.com</a>, provide additional information like article metrics and recommendations, showing the importance and relevance of each resource.</td>
</tr>
<tr>
<td>Encyclopaedia</td>
<td>Wikipedia and similar open online encyclopaedias, such as <a href="http://edutechwiki.unige.ch">edutechwiki.unige.ch</a>, provide a massive repository of information that could be used as learning resources by students. Although entries are interconnected, the search mechanism is more focused and objective, trying to provide students with the best match.</td>
</tr>
<tr>
<td>Video collection</td>
<td>Video galleries/collections, like TED Talks, are gaining ground as learning resources. They are covering a wide range of intriguing topics and they are usually appealing to the students.</td>
</tr>
<tr>
<td>Multimedia collection</td>
<td>Multimedia collections, such as iTunes U, educational audio and video files from universities (e.g., <a href="http://itunes.stanford.edu">itunes.stanford.edu</a>), museums, and public media organizations for free download. More and more organizations use this medium to reach a wider audience, and as a result, this type of learning resource has drawn the attention of many students.</td>
</tr>
</tbody>
</table>
### 4.2 Production tools

Production tools may include tools and services focused on creating ideas and products. In the context of learning, these products could be concept maps, wikis, multimedia documents, notes or reports, blog posts, presentations, screencasts, etc.

<table>
<thead>
<tr>
<th>Production tools</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td><strong>Mind-mapping</strong></td>
<td>Mind mapping tools, such as MindMeister and FreeMind can be used to generate, visualize, structure, and classify concepts, ideas, and models and by doing so, they can support studying, organizing information, and problem solving activities.</td>
</tr>
<tr>
<td><strong>Video production</strong></td>
<td>Creating a video has been a common learning activity for students. As such, the use of video producing/editing tools like iMovie, Windows Movie Maker, and YouTube Video Editor by students has increased dramatically over the years.</td>
</tr>
<tr>
<td><strong>Audio production</strong></td>
<td>Similarly to video production, audio production/editing tools, such as Audacity, have also increased their popularity among students. Such tools are commonly used to create educational podcast.</td>
</tr>
<tr>
<td><strong>Note taking</strong></td>
<td>Note taking software like Evernote and Microsoft OneNote can be used to annotate a wide range of resources, or create collections. A note could be handwritten, typed, or spoken.</td>
</tr>
<tr>
<td><strong>Blog</strong></td>
<td>Blog tools, such as Blogger and WordPress, support the creation of a discussion or informational site and consisting of discrete posts, organized in chronological order. A blogs can be operated by and individual or a group and provides commenting/discussing functionalities for visitors. Blogs are widely used in educational contexts (these blogs are also known as edublogs).</td>
</tr>
<tr>
<td><strong>Presentation/storytelling</strong></td>
<td>One of the most common types of learning products is a presentation document. Apart from the well-established Microsoft PowerPoint, tools such as Prezi, are now provide the ability to student to easily create appealing presentations and stories on a virtual canvas.</td>
</tr>
<tr>
<td><strong>Screencasts</strong></td>
<td>A screencast, or screen capture, is the digital recording of a computer screen often accompanying by audio narration. Tools such as screen-cast-o-matic and Camtasia can be used to create screencasts, while the use of this type of product is very common in educational contexts (e.g., tutorials and instructional videos).</td>
</tr>
</tbody>
</table>

### 4.3 Sharing tools

Sharing tools support the distribution of ideas, materials, and products with other people. Sharing could refer to images, slides, multimedia files, etc.
**Sharing tools**

| Video sharing | Video sharing is a very common practice for online users, and consequently, it has become a common thing in education, as well. Video sharing platforms, such as YouTube and Vimeo, have millions of users, while they also support video channels and playlists. |
| Photo sharing | Photo sharing tools, such as Flickr and Picasa, allow the student to create collections of images with a common theme and share it with other people. These tools also support distribution of material over groups of people with same interests. |
| Presentation sharing | Finding a presentation online has become common, while uploading a presentation as a way to gain attention and visibility for work done is increasing. As such, tools such as SlideShare, are also used in education. |
| File sharing | Apart from sharing tools that focus on a specific file format, there are also generic file sharing tools that could be used to share any kind of documents with other people. Dropbox and Google Drive are perhaps the most common tools in this category. |

**4.4 Collaboration tools**

Collaboration tools can support synchronous or asynchronous collaboration of a group of students on the same product.

| Collaboration tools |
| Documents | Co-authoring a document is a very common practice. Tools, such as Google Docs, allow for synchronous co-authoring, while functions, such as document history, allow the students (and the teacher) to keep track of everyone’s contribution to the final product. |
| Whiteboard | A shared whiteboard is a virtual space where people can write, design, or add graphic, in a synchronous way. Tools, such as Twiddla, can be used as a web-based meeting room for a group of students. |
| Wiki | Wikis are typically text-based, with several multimedia documents embedded into them. In the most common form, a wiki is a webpage, created usually by a group of people. In other words, a wiki is usually the product of student collaboration. Tools like Wikispaces and PBWorks, are commonly used for creating a wiki. |
| Peer feedback | Activities supporting peer feedback can be supported in many tools. However, there are also tool, such as PeerWise and curriculearn, where... |
the process of producing peer feedback is at the centre of the learning activity. Both tools focus on how to provide better feedback on student-generated questions and while PeerWise supports closed-type questions, curriculearn allows open-ended ones. Both tools are available in AU (curriculearn had also been developed in AU) and can be used to engage students both in acquiring domain knowledge and developing reviewing skills.

4.5 Communication tools
Communication tools focus on supporting direct communication between students and/or teachers. Communication could happen in synchronous or asynchronous way, while communication could be based on text, speech, and/or video.

<table>
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<tr>
<th>Communication tools</th>
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<tbody>
<tr>
<td>Video conference</td>
</tr>
<tr>
<td>Video conference tools are the norm in many settings where people need to communicate directly. Tools like Skype and Google Hangouts, supporting video calls with many participants are extensively use and are available to all students that use a computer.</td>
</tr>
<tr>
<td>Written discussion</td>
</tr>
<tr>
<td>A big part of student communication over the Internet, still happens asynchronously. In most cases, this form of communication appears as a discussion on tools like a Forum, organized according to themes, categories, and threads of discussion.</td>
</tr>
</tbody>
</table>

4.6 Social networks
Social networks allow high visibility and increase connectivity between students and/or teachers. Following the high penetration of such tools in society, these tools are now also utilized for educational purposes.

<table>
<thead>
<tr>
<th>Social networks</th>
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</thead>
<tbody>
<tr>
<td>Facebook</td>
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<tr>
<td>Facebook’s ability to support public and closed groups made it also a useful tool for educational purposes. Apart from the obvious benefit of having students (and teacher) highly connected, Facebook provides an social environment outside the classroom where students can discuss course issues.</td>
</tr>
<tr>
<td>Twitter</td>
</tr>
<tr>
<td>Twitter provides similar benefits to Facebook, although the open nature of the tool and the use of hashtags make it more appropriate for connecting people according to their interests and not their participation in a group.</td>
</tr>
</tbody>
</table>
4.7 Assessment tools

Assessment tools can be used in formative evaluation to record the current progress of the student and identify issues to be addressed, but also in summative evaluation to assess the outcome of a learning activity. In addition, assessment tools can be used by students as a self-evaluation tool, or by teachers for grading purposes.

<table>
<thead>
<tr>
<th>Assessment tools</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiz</td>
<td>A quiz is compiled by a set of closed or open-type questions that require a right answer. Quizzes can be used in many ways and with different formats. That is why several tools and LMSs, such as Google Forms, Blackboard, and Moodle, have embedded functionalities for creating a variety of different quizzes.</td>
</tr>
<tr>
<td>Questionnaire</td>
<td>Questionnaires are also compiled by a set of question. However, what the students are asked to provide is not a right answer, but information, or opinions on an issue. Such questionnaires, especially when the final results are shared with students, could be used to help students understand where they stand compare to their fellow classmates. Once again, questionnaire creation functionalities are embedded into Google Forms, Blackboard, Moodle, and also is specific tools such as SurveyMonkey.</td>
</tr>
</tbody>
</table>

4.8 Integrating new tools into LMSs

Learning management systems, such as Blackboard and Moodle, provide a wide range of tools to address different learning needs. For example, content management, blogging, discussion forums, and quizzes have been a part of LMSs for a while. However, since a single platform cannot provide (at least at the same level) all the functionalities of the tools described above, the trend is to embed these tool into LMSs. For instance, it would be a huge feat to recreate a social network like Facebook inside an LMS. Luckily, it is now possible to embed the news feed of a Facebook group into a Blackboard course. Similarly, early LMSs used to provide blogging tools, but possibly without all the possibilities or user experience of a regular blog. As an example, WordPress can now be fully embedded into Blackboard.
Other Resources

As we pointed out at the beginning of this booklet the material here is intended as inspiration to engage teachers with different ways of thinking about how (entrepreneurial) learning takes place in situations that they instigate. The suggestions made here are a starting point to exploring tried and tested methods in new ways or for trying new methods in traditional settings and as such this list is not complete. We therefore suggest the following links which we hope will lead to new paths and inspirational learning journeys for both teachers and students.

Interdisciplinary Community of Advanced Research in Entrepreneurship (ICARE) @ Aarhus University  
[http://badm.au.dk/research/research-groups/icare/](http://badm.au.dk/research/research-groups/icare/)

Information about publications and research in Entrepreneurship Education @ Aarhus University  
[http://badm.au.dk/research/research-groups/icare/pace/](http://badm.au.dk/research/research-groups/icare/pace/)

Innovation and Entrepreneurship in Education Tool box of methods @ Copenhagen University  
[http://innovationenglish.blogs.ku.dk/](http://innovationenglish.blogs.ku.dk/)

Workshop run annually @ Aalborg University in Innovation and Entrepreneurship  
[http://www.wofie.aau.dk/](http://www.wofie.aau.dk/)

Entrepreneurship courses for students and teachers @ University of Southern Denmark  

A list of courses and readings and tools for entrepreneurship @ Copenhagen School of Entrepreneurship (Copenhagen Business School)  
[http://cse.cbs.dk/](http://cse.cbs.dk/)

Inspiration for entrepreneurial pedagogy @ EM-Lyon School of Business, France  
References


