METHODOLOGY D-EMIND
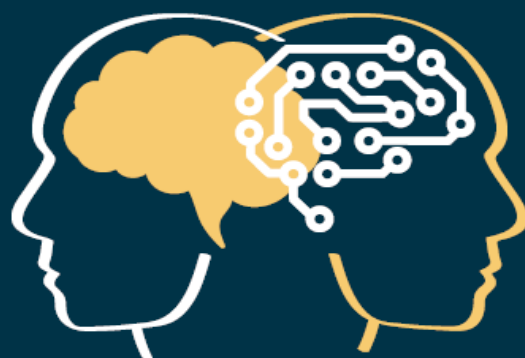## Digital Entrepreneurial Mindset

A guide to Innovative, Digital and Entrepreneurial Learning Processes

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Methodology D-EMIND

Digital Entrepreneurial Mindset

A guide to Innovative, Digital and Entrepreneurial Learning Processes

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The Atom Model

1.   The Didactics of the digital Atom Model

The Atom Model, which we developed within the ForEMLink project, is a way of fostering an entrepreneurial mindset in Higher Education on a local, national, European and global scale. The aim is to promote entrepreneurial competencies in higher education students through learning processes that teachers can facilitate with creative, innovative and entrepreneurial activities. The Atom Model suggests a process and activities that teachers can use to promote the development of entrepreneurship for students. It is based on a partnership perspective on how one may integrate entrepreneurship as a natural element in Higher Education courses.

From our perspective, practice-oriented teaching is essential for developing students' entrepreneurial mindsets and action competencies while encouraging the application of theoretical perspectives and reflection. Practice-oriented teaching does not conflict with theory comprehension. In Bloom's taxonomy, a high level is achieved not only by understanding and applying a theory but also by transferring it in simple and complex contexts. Partnership members believe that students must be trained to understand that the 'real-world' often differs from the technical theories and academic criteria of higher education.

We created the Atom Model in a manner that allows it to be moulded, adjusted, and adapted according to the curriculum and learning framework in which it is used. It contributes to developing teaching plans to integrate entrepreneurship into lessons as a natural element.

The Atom Model starts with a practice-oriented challenge: the paradigm through which students are trained to handle real-world challenges. The model may be seen as a framework on how to approach a challenge and how lessons in innovation and entrepreneurship may be managed in a constantly changing context. In Higher Education, the framework and conditions, such as formal requirements and curricular guidance, will always apply. However, the dynamism of this context offers didactic possibilities in which the Atom Model may be used as an inspiration for concrete initiatives.

The design of the Model allows for different interpretations and use cases. For instance, one may choose activities from specific elements of the model to work on particular subjects in the interest of the course they are preparing. Similarly, one may select activities related to the subject and curriculum criteria of an existing course. This flexibility in the form of modularity allows for entrepreneurial activities to be adjusted to the subject area with the specific didactics employed within the timescale the teacher has at their disposal.

In the entrepreneurial process, students must be given a clearly defined task that incorporates the curriculum's demands and is openly formulated so that the students can produce creative and comprehensive solutions. This balance between restriction and freedom is a prerequisite for innovation and creative solutions.

The process starts and ends with a challenge at the core of the Atom Model, to which neither the teacher nor the students have the solution. Throughout the six elements of the model, the students and teacher discover that dealing with challenges using various approaches and activities produces different solutions. Part of the process is to step into uncharted territory in terms of knowledge, risk-taking, making mistakes, learning, and trying again. Initially, the path to a suitable solution has yet to be discovered, and it may take students several attempts to find it. Therefore, it is essential to be open to new solutions and not assume that the answer to a challenge is known beforehand. Students may suggest excellent solutions of their own, allowing them to develop their skills and become more

knowledgeable in a specific area. With the six elements of the Atom Model, one will discover that the focus constantly changes. For example, it can shift from concrete field observations and understanding real challenges to intense idea generation. Subsequently, it switches to a process through which the ideas with the most outstanding value are selected. These processes promote an entrepreneurial mindset, increased motivation, creativity, and the generation of new solutions.

The units that can work with the Atom model can be a project group, a class, or several classes. When the teacher facilitates the students throughout the six elements of the model, the same project group, class, or several classes must work with the same challenge in the whole innovation process of the elements. The reason is that the core of the model is the challenge, and the rest of the process circulates that and decides what the students need to work with. The teacher can make randomised groups with other students who work with different challenges in some activities. But the purpose of talking with other students will always be collecting ideas for their own challenge and bringing them back to the project group or the class or whatever unit is co-working to solve the challenge in the core of the Atom model.

The element of unpredictability reflects reality - the immensely complex reality in which Higher Education graduates all over Europe are immersed once they start their careers. Thus, this form of training develops entrepreneurial competencies and prepares students to handle real and complex but solvable challenges developing competencies that are in high demand among employers. Furthermore, the labour market for Higher Education graduates across Europe is characterised by multidisciplinary collaboration and an entrepreneurial mindset. Therefore, we consider entrepreneurial competencies essential for all graduates and students across study programmes. In addition, these are in increasingly high demand and vital in a dynamic and globalised society.

1.1. How to work with the Atom Model

A linear process from elements 1 through 6 is a good way to start if one is unfamiliar with entrepreneurial processes. As stated previously, one can select a few activities from each element and follow them chronologically. In this manner, one can become accustomed to the complex processes included in the Atom Model and familiarise oneself with the iterative process. Additionally, as you become more familiar with the Atom Model, you can develop new activities that fit your unique teaching style and context. These activities can become part of an individual's unique Atom Model toolbox.

We would be more than grateful if you would send your activities to us:

info@demind.eu or https://www.demind.eu/contact/

Then we can upload them to our platform, where we will credit you as their inventor.

1.2. Why facilitation and not teaching?

Developing an entrepreneurial mindset requires a shift in the traditional teaching approach, from conveying specific knowledge to facilitating reflection and experience. It's about learning to see possibilities or experiment with solutions, and therefore not something you can learn through traditional teaching, but only through reflection and experience. Thus, your role shifts from being a teacher/lecturer, conveying specific knowledge to the students, to one of the facilitators, where you and the students are on the same level in the process. The process becomes a joint effort between you as a facilitator and the students for what is learned and taught and creates a symmetrical space

where participants are equal as knowledge-bearers regarding finding solutions to the challenge at hand. This is because when dealing with real-world challenges, where no solution is found in advance, the process explores new and unknown areas, where both, you and the students, are hunting for the best solution to the challenge (Pedersen, 2019).

In terms of digital education, the same premises apply. However, to create the best circumstances for facilitating an entrepreneurial mindset in the digital domain, it's important to consider the differences between physical and digital learning spaces and take advantage of the digital world's possibilities.

1.3. Facilitating in the digital space

The teacher is an essential factor in creating an innovative learning space. During the innovative process described in the Atom Model, the teacher must balance structured and traditional teaching with an inclusive, activating, and improvising approach. The teacher moves from imparting specific knowledge to students and controlling the process to facilitating students' active participation in their own learning process. The teacher thus co-creates the learning space with the students. In this shared initiative, everyone assumes responsibility for what is being taught and learned. The teacher engages in interactive communication with the students and acts as a supervisor, providing feedback and challenging the students' solutions.

Facilitation is always bound by the conditions in which the process is presented, in this case, the digital domain, and as a facilitator, you must accept these circumstances for the facilitation. In the digital domain, the conditions for facilitation change for you as a facilitator and for students too. These changes in conditions can impact, for example, how you interact with your students, your ability to observe and contain the room, social interaction, and more.

Facilitating in the digital learning space also mean a learning process for the facilitator inside and outside the classroom. This continuous learning process gives the tools and experience to solve problems quickly and with the best option available. At the same time, the facilitator relies on colleagues and professional networks to support their work promoting formal and informal learning. Collaboration and interaction are very important for both learning process and professional development. Also, the facilitator keeps up to date with the latest developments in their professional teaching activity to improve their facilitating task. The strive to improve their facilitating activity also implies a continuous reflection on their professional activity which also helps to develop the necessary autonomy to develop their facilitating teaching.

Therefore, in this introduction to the digital learning space, we will try to highlight and accommodate some of these opportunities you, as a facilitator, can experience while teaching in a digital space and what you can do to create a good and positive learning experience for your students. In addition, we will provide examples of new factors, both those outside of your control and those you can influence, and how this might point the facilitation in a particular direction.

1.4. The iterative process in the Atom Model

The six elements in The Atom Model do not constitute a linear process- even though their presentation may suggest so, but an outline of the entire iterative and complex process of innovation and entrepreneurship.

In practice, one moves back and forth across the six elements and works through them depending on how the challenge and ideas change. During the innovative and entrepreneurial process, one must

deal with what emerges and seek to manage the iterative process, which may mean taking 'two steps forward and one step back'. The iterative process will most often provoke resistance, but when we deal with something new and unknown, we create a rewarding environment for learning. Innovation and entrepreneurship processes can be complex and chaotic and include the collision of ideas and feedback mechanisms. The division of phases in the Atom Model is a contributory tool for identifying the central elements of the innovation and entrepreneurship processes.

It may, at first sight, seem paradoxical to arrange an innovation process in elements given that reality can be chaotic or iterative. However, we view the division of the process, as described in the Atom Model, to sharpen its general outline. Thus, when one is in the middle of the process, one can accommodate its complexity and gain an understanding of the elements through which one is navigating.

After the completion of each element, the teacher and students must collaboratively decide whether they are ready to proceed to the next phase or should remain in the current element to adjust and develop their ideas and competencies. Considering the iterative nature of teaching, the teacher and students might also go back to a previous phase. For instance, a client's or user's criticism of the prototype after element 4, may suggest that the students and teachers must return to element 3 and develop new ideas. Or perhaps one must stay in the element for longer – adjusting the prototype - before moving on to element 5 (realise).

1.5. Circumstances beyond your control

To implement the ATOM Model we must consider that, as a facilitator, one can experience some opportunities given the circumstances that are even though are outside of your control, you can influence, and you can point the facilitation in a particular direction.

The location: When facilitating digitally, the location of the students is beyond your control. This refers to what stimuli are present, but also to the resources available to your students. The reason is that you cannot predict in which room the students will be located. Some might be in a home office, others in the living room, and others might still be at the library. This creates the possibility of external stimuli that might cause students to lose their attention. You, as a facilitator, can only account for some things. Therefore, it is essential that you don't only think about *what* you are presenting but also *how* it's being presented. This is your best tool to keep your students' attention and recapture it, should their focus drift.

Body language: In the digital space, your ability to read the body language of the students almost completely disappears. Within the digital space we as facilitators might only have access to students' faces and perhaps the upper portion of their bodies. Therefore, we don't have the same ability to read the student's body language as we are used to in the physical domain. But in this regard, even a little information is better than none. This is the reason why we recommend that within the class, it's mandatory to have the webcam turned on. This allows for a bond between the students to be built since they can put a face on their classmates, but it can also help you gauge your students' attention and give you better feedback on whether the students have understood the tasks assigned to them.

Informal learning: In the digital space, informal learning appears to be an alternative to traditional forms of teaching and learning. The interaction among participants generates social relationships that helps the learning process beyond the facilitator action. Informal learning has been proved as a strong tool for promoting significant learning among participants.

1.6. Recommendations for the facilitation

Facilitating in a digital space is different from in-person teaching, and it is necessary to consider some recommendations to guarantee its effectiveness.

Guidance in the session: Facilitating a learning process is about understanding when you can let the students complete the task on their own without the intervention of you as a facilitator and let them use the learned tools and own intuition to work on the project. This does not change in the digital space, but since there are other social norms in the digital space, it's crucial that you consider these differences. For example, phenomena like "awkward silence" and "small talk" do not occur in the same way digitally as they do in the physical space. In a digital environment, silence is accepted on another level, and no one might feel the need to break this silence. Small talk does not occur either since at any given point, there can only be one person who talks at a time digitally; otherwise, all conversations will blend and just create an incoherent noise. It's therefore essential that you as a facilitator understand these premises and at the start of the process take control of what and when students are to complete certain aspects. As the students get more familiar with the process, begin to have tools to tackle the challenge, and have a more robust understanding of the process, it's vital that you then give them the required space. Let them make their own understanding of the process and the project. So, keep in mind, start with a high degree of guidance, but as time goes on, the importance of a rigid structure dwindles (Jensen, 2020).

Make it interactive: The more interactive the process is, the more ownership the students feel for it. For this reason, you should make the process interactive by getting the students to fetch an object to use in the class or smaller groups/breakout rooms. This gives the students energy by getting physically engaged, but they also get more involved with the process by having to select an object that will have an active impact on the process they are embarking on. The students become active participants in the class and not just passive listeners.

Create social relations: We, as humans, are social beings and thus learn best through social connections and interactions. Consequently, social relations in the class must be strengthened, so the students feel secure and comfortable working with one another. A facilitated process to achieve this is essential, especially in the digital domain, where the interactions happen naturally in the physical space and won't happen the same way in the digital environment. Accordingly, spend some time creating these relations through tasks and objectives throughout the class. This can be longer facilitated activities with the sole purpose of strengthening these social bonds, but also minor discussion tasks, where the students are put into smaller groups and where they must use both personal experiences and the academic content they are taught about the subject.

Create challenge-driven units: When working with the digital Atom Model and the six elements, a fundamental condition is that the same students must work together on the same challenge. The challenge is at the core of the Digital Atom Model process. It is what the students and teachers, throughout the whole process of working with 'real life projects', must initiate from and return to. The chosen units of students -project group, class, or several classes- will use the six elements (Explore, Analyse, Ideate, Prototype, Realise and Evaluate) to steer the process and solve the challenge. The unit can be one project group consisting of 2-6 persons. It can also be the whole class consisting of 10-50, or it can even be several classes from 50-150 working together to solve the same challenge, e.g., in an Innovation-camp. There is a progression of the learning process when working with the six elements. That means you need to work with the same challenge and go through exploring that challenge and analysing the data that you have collected from the specific challenge and make it the background for ideating and afterwards choosing an idea for solving the challenge that you make a prototype to test, realise and get feedback before you evaluate it.

Alignment of expectations: As humans, it's easier for us to cooperate when we know what's expected of us. When we know what is expected of us, it's possible to live up to these expectations, but others also have an easier time holding us accountable to these expectations (Michael, Sebanz & Knoblich, 2016). This creates a sense of commitment among the students and engages them in the process. Note that negotiating expectations does not happen naturally in the digital space, so it is essential for facilitators to explicitly help students with this process. We highly recommend that you, together with the student, create a "Code of Collaboration", in which the students negotiate what is expected from them in the process. Also, as a facilitator, clearly communicating your expectations to the students is vital.

Selecting the tools: In the digital learning space it is important to consider the diversity and heterogeneity of tools and resources, delimiting relevant criteria for their selection. The purpose, the context, the beneficiaries and/or the relevance of the topics that we want to address could be consider as part of the criteria. Technical aspects include aspects such as functionality, authorship, support, and maintenance. Pedagogical aspects are focused on the learning opportunities that the tool provide. The two criteria combined are essential to decide on one tool or another, prioritizing the interaction and flexibility in the session. To choose the most suitable option, some previous question we can ask ourselves as facilitators are related to the users' profile, the aim we are pursuing, what resources we have, what are the main features of this tool and how are related to the content we are going to work.

We present in the next table some of the tools the facilitator can use at each stage of the Atom Model:

Table 1. Resources for the digital approach to the Atom Model.

Stage	Description	Resources	Free	Link
A. Mental	Encourages the entrepreneurial mindset to help the students complete the 6 elements of innovation	Virtual whiteboard	-	-
		Breakout rooms	-	-
		Padlet	Yes	Link
		Random Word Generator	Yes	Link
		Random Image Generator	Yes	Link
B. Social	Social relations and the collaboration between students	Virtual whiteboard	-	-
		Breakout rooms	-	-
		Padlet	Yes	Link
		Team generator	Yes	Link
		16 Personalities (personality test)	Yes	Link
0. Challenge	It is what the students and teachers throughout the whole process of working with 'real life projects must initiate from and return to- therefore it has a	Virtual whiteboard	-	-
		Breakout rooms	-	-
		ForEMLink Challenges	Yes	Link

Stage	Description	Resources	Free	Link
		central place in the model		
1. Explore	Identifyng the cause of the challenge to create an optimal solution	Virtual whiteboard	-	-
		Team generator	Yes	Link
		Padlet	Yes	Link
		Online Voice Recorder	Yes	Link
		Symbaloo	Yes	Link
		Pinterest	Yes	Link
2. Analyse	Analyse important information to develop a clear vision of the challenge	Virtual whiteboard	-	-
		Padlet	Yes	Link
		Team generator	Yes	Link
		CmapTools	Yes	Link
		Coggle	Yes	Link
		Blooming Ideas	Yes	Link
		GoMoodboard	Yes	Link
		Notion	Yes	Link
3. Ideate	Promote the ability to empathise with users	Virtual whiteboard	-	-
		Breakout rooms	-	-
		Random Word Generator	Yes	Link
		Random Image Generator	Yes	Link
		Team generator	Yes	Link
		Wordart (word cloud generator)	Yes	Link
		Mentimeter (polls and presentations)	Yes	Link
		Blooming Ideas	Yes	Link
		Canva	Yes	Link
		Pomodoro timer	Yes	Link
4. Prototype	Analysing important information to develop a clear vision of the challenge	Virtual whiteboard	-	-
		MarvelApp	Yes	Link
		Lego Games	Yes	Link
		Padlet	Yes	Link
		Sketchup	Yes	Link
		AutoCAD	No	Link
		Canva	Yes	Link
		Tinker Cad	Yes	Link
		Figma	Yes	Link
		Genial.ly	Yes	Link

Stage	Description	Resources	Free	Link
5. Realise	Persuading the audience to buy, invest or collaborate in your challenge	Virtual whiteboard	-	-
		Google Slides	Yes	Link
		Microsoft Power Point	No	Link
		Trello (planning boards)	Yes	Link
		Notion	Yes	Link
		Microsoft To Do	Yes	Link
		Slack	Yes	Link
		Dropbox Paper	Yes	Link
		Preceden (timeline)	Yes	Link
6. Evaluate	Students receive feedback on their solutions from external partners	Virtual whiteboard	-	-
		Breakout rooms	-	-
		Self-assessment questionnaire	Yes	Link
		Kahoot	Yes	Link
		Google Forms	Yes	Link
		Quizziz	Yes	Link
		Socrative	Yes	Link
		Rubrik Maker	Yes	Link
		Vevox (polling and Q&A)	Yes	Link
		Plickers	Yes	Link

These tools help the processes of teaching and learning by taking advantage of the benefits of 'design thinking' and facilitation in digital environments, both in challenge-based learning.

1.7. Final considerations

The suitability of the didactic approaches and the selection of the digital tools to be used must always be subject to the objectives pursued by the training (including concepts, developments, attitudes, etc.). For this reason, one can select a few activities from each element and follow them chronologically and develop new activities later. The ATOM Model is designed to promote entrepreneurial competencies in higher education students through learning processes that teachers can facilitate with creative, innovative, and entrepreneurial activities.

2. An Illustrative Overview

In order to guide the reader through the activities in this handbook, we have developed pictograms to illustrate the different aspects of the activity. Here you find an overview and short explanation of each pictogram.

| Activity | The purpose of the activity | The duration of the activity | Number of students Number of groups |

| The materials used for the respective activity | Description of the activity | Reflection | Inspiration |

3. Learning Sphere Activities
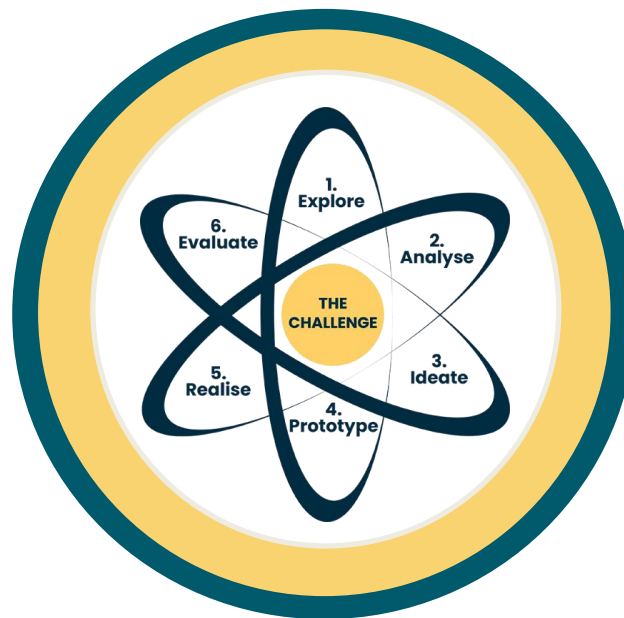
The Learning Sphere circulates around the 6 elements of innovation in the atom; the spheres are social and mental. The spheres are important for the teacher to work with since it influences the 6 elements of Innovation.

Learning Spheres must be designed so that students are supported in the process of creating a meaningful correspondence between the real-life project and their education, including the theories and their experience.

If the students are to develop a solution during an innovative process, the facilitating lecturer must deal with the essential task of creating a learning Sphere in the initial stage. It is the lecturer who must set the framework for the right atmosphere. It is recommended that it is introduced at the beginning of the innovative learning process, considering that the active creation of the learning environment is an essential prerequisite for the successful lesson on innovation. It is necessary for the lecturer to facilitate those complex and demanding innovative learning processes to encourage the creative, innovative and enterprising mindset of the students. A part of this facilitation is to create a learning sphere, which inspires and motivates students to become active throughout the six elements.

A.   Mental
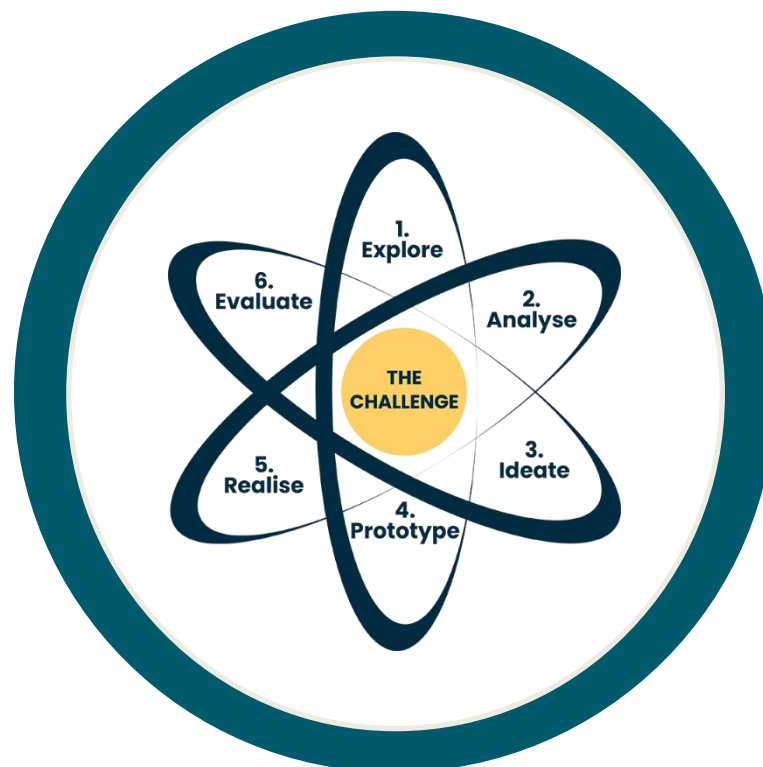
The mental sphere in our perspective encourages the entrepreneurial mindset to help the students complete the 6 elements of innovation. The entrepreneurial mindset must, to some degree, be present during the innovative learning process for the students to be able to work within the elements of innovation and at the end of the process to create a solution for the challenge in the core of the model. The entrepreneurial mindset includes a creative mindset, a 'possibility' thinking and a desire to act, which must be developed as part of the innovation process in students and teachers alike. This requires that students are constructive and apply 'possibility' thinking when they encounter difficult, but solvable dilemmas in practice. A part of this 'possibility' mindset is to act when dealing with problems.

For some students, the entrepreneurial mindset, 'possibility' and creative thinking requires practice as it is unfamiliar to them, and they are not accustomed to it. Therefore, we have developed some activities within the mental sphere to develop the skills in the students.

The challenge of improvisation is that one must always be able to listen to and build upon others' ideas (yes, and…). Students and teachers must accept the offers and possibilities they encounter in the learning process. As an adult student, it can also be challenging to do something, which adults associate with playing. When communicating with others, the method of saying "yes" to each other's ideas is important. Students must accept the others' perspectives in order to create an open mindset that later in the process can facilitate them to find new solutions for the challenge.

Furthermore, the students must not perceive the problems arising during the solution of the challenge in the core of the model as overwhelming. They should learn that the problems give them the

opportunity to affect and change the process and steer it in a positive direction, as long as they stay within the conditions and rules of the subject field.

A.1 Party Time

Mental   *Author:* Anni Stavnskær Pedersen   *Facilitated by the Teacher*

The aim is to allow the students to practise their improvisational skills and give them an understanding of how associations and sudden inputs can form the foundation of fantastic ideas.

5-10 min.   2-40 students   Padlet, a virtual whiteboard and breakout rooms in Teams/Zoom

Steps

1. The students are asked to pair up with someone who shares the same shoe size as them – or those which are close in size (labelled Student A and Student B), this can be done by having the students write their shoe size in the chat, and then matching them up through there.
2. The teacher informs the students that they must plan the annual party in pairs e.g., a summer party or Christmas party.
3. The teacher asks each student to go to this link to find either word cards og picture cards to stimulate the creative process: 'https://randomwordgenerator.com/' or 'https://randomwordgenerator.com/picture.php'.
   - If they are given word cards, they should set the generator to 1 noun.
   - If it is a picture card, they are to set the generator to 1 picture.
4. The teacher then demonstrates how the students can begin to plan the party using the words/pictures:
   - Student A must use the word written at the top of the word card, or the picture illustration, in the party.
   - Student B then links Students A's idea to the word/picture they were given
   - The process continues until all cards are used. The teacher interrupts the breakout room meeting when the decided time is up. Between 7-10 minutes.
5. The students work with one word/picture at a time and have to generate a new word or picture each time they switch to main speaker. So, after Student A is finished speaking, Student B presses 'generate' so they don't know what they have to implement until just then, and vice versa.
6. The students link all the ideas together as they appear to create the annual party.
7. After seven to ten minutes the teacher stops the activity and asks the students to present their ideas for the party.

8. The teacher may ask the students if they wish to share their ideas with the class on what a good party would be like. More ideas are shared, which may energize and motivate the students to create their party.

Reflection

This activity can be used as warm-up for the association exercises that are a part of the solution of the Challenge in the ideation element of the Atom Model.

Smaller groups should be used when doing this activity online to avoid students having to wait a long time to present themselves.

A.2 Alternative Presentation

Mental   *Author:* Anni Stavnskær Pedersen   *Facilitated by the Teacher*

The aim is to train the students' associative competencies by asking them to present themselves in a different way from that which they are used to. Open the students' minds to different stimuli and train the students in saying "yes and…". A skill that is important in the Ideation element of the Atom Model.

5-10 min.

2-40 students

One object from near vicinity
Padlet, virtual whiteboard and breakout rooms

Steps

1. Each participant finds an object in their near vicinity to use for the task (Give them 30sec-1min to collect the object). It is important that it is not told to the participants what the object is for, just that they will need it.
2. The teacher demonstrates how to present oneself based on the object they have chosen.
3. With up to 10 participants the presentation can be done collectively, with +10 participants they are divided into groups of up to 5 per group per breakout rooms.
4. The students are given 2-3 minutes to present themselves based on the object they have chosen. This might include name, what they study, and what their hope to get out of the course, and how their chosen object reflects that.
5. The student must listen attentively to their partner.
6. The teacher asks the students to reflect and discuss "How it felt presenting oneself in this alternative way and if they told their partners something different from that which they usually told others about themselves".

Reflection

This activity can be used as warm-up for the association exercises that are a part of the solution of the Challenge in the ideation element of the Atom Model. Smaller groups should be used when doing this activity online to avoid students having to wait a long time to present themselves.

A.3 Digital Storytelling

Mental   *Author:* Anni Stavnskær Pedersen   *Facilitated by the Teacher*

The aim is to strengthen the belief among students those creative ideas may be developed through improvisation by using the phrase "Yes, and…"

10-20 min.

16 - 30 students

Padlet, a virtual whiteboard and breakout rooms in Teams/Zoom.

Steps

1. The teachers have paired up the students beforehand and share the list with names in the teams-room and ask the students to listen to the instructions and afterwards check in to the Teams room with their number. The teacher has premade digital rooms with numbers on them.
2. The teacher tells the students that they all start the story with "We went into the woods and then what happens? One in the pairs is responding to story with the phrase "Yes, and then what happens is...". The teacher demonstrates this with a student. The recipient decides what the next step is in the story with the only limitation being the individual's imagination. The pairs can choose if they will write the story down and do the exercise in writing or do it orally since both will help the purpose of the exercise.
3. The students take it in turns to continue the storytelling and take turns with continuing to tell the next step of the story until the 10 -20 minutes are up.
4. The teacher asks the students to reflect and discuss their experiences from this activity. For some, the imaginary aspect can be challenging. An exercise that encourages participants in saying "Yes, and…" while spontaneously coming up with an idea may be challenging. Therefore, the teacher can also emphasise that practising saying "Yes, and…" to what the other students offer and being positive towards one's own ideas are essential skills especially when they must do this during the innovation process.

Reflection

The storytelling can have other starting points depending on the situation. For example;" Once upon a time a princess was born, " Once upon a time a dragon came in to a village "or something else. The important point here is the training of creativity of the students by saying "yes and..". A skill that is important in the Ideation element of the Atom Model.

A.4 Backwards Focus

Mental   *Authors:* Christian Byrge & Søren Hansen   *Facilitated by the Teacher*

The aim is for the students to practise their mental focus and practise breaking their existing thought patterns.

15 min.	10-20 students	Breakout rooms in Teams/Zoom

Steps

1. The Teacher asks the students to put the month and day of their birthday in the chat. The person closest to their own birth date is their partner. The teacher distributes the pairs in breakout rooms.
2. The teacher tells them to tell their partners about their morning up till that point. Their descriptions must be as detailed as possible (2 minutes per person).
3. The teacher instructs them to talk about their mornings, but in backwards order, e.g. from the present to when they got out of bed that morning. Their descriptions must be as detailed as possible (3 minutes per person).
4. After the exercise, the teacher asks the students if they managed to reach the stage of telling their partners about getting out of bed. The teacher asks the students to say how it felt to break from the usual way of telling others about their day:
   - Was it difficult to remember and remain focused?
   - The teacher can discuss with the students the issue of focus and attentiveness, which are essential skills when beginning the six phases of IC.

Reflection

This activity helps them become aware of their personal habits and life patterns.

The activity could be done using online tools such as Padlet, a virtual whiteboard and breakout rooms in Teams/Zoom.

A.5 When are you Creative?

Mental　　　　*Author:* Anni Stavnskær Pedersen　　　　*Facilitated by the Teacher*

The aim is for the students to reflect on their creativity before entering the innovative process in the Atom model.

15-20 min.　　　　16 -30 students　　　　Virtual whiteboard

Steps

1. The teacher asks the students a series of questions:
   - When do you get good ideas?
   - Where are you when you get good ideas?
   - What do you do when good ideas come to you?
   - What do you think helps you to generate good ideas?
2. The students write their answers on virtual whiteboard/Padlet.
3. The teacher and the students review the list on the Virtual Whiteboard and group them together trying to identify any patterns, similarities, and differences in the post-its.

Reflection

This activity can be conducted after a chat about creativity with the students to put them into the right mindset for progressing to the elements in the Digital Atom Model.

A.6 The Paperclip

Mental   *Adapted:* Aleix Barrera, Diego Castro,   *Facilitated by the Teacher*
David Rodriguez-Gomez

The aim is to avoid self-censorship in the creative processes.

10-20 min.   15-30 students   Virtual whiteboard

1. The teacher makes a shared document in the virtual whiteboard.
2. The teacher asks the students to list all the uses for a paperclip they can think of - this should take approximately 1 minute.
3. The teacher asks students to analyze their list by asking themselves the following questions:
   - Have you thought of any 'alternative' uses for a paperclip? For example, to pick a padlock or the lock on a box that belongs to someone else.
   - Have you written these uses down or have you thought that it was better not to, so as not leave out any evidence?
4. The teacher brings the students together in the online room to discuss the following points:
   - Do we censor ourselves when we think?
   - When we 'thought-shower', is the most important thing the number of ideas generated or the validity of what we expect the result to be?
   - Should moral dilemmas have to be removed to reveal brilliant ideas that initially may seem absurd, disrespectful, or crazy?

Inspired by: https://thinkernautas.com/2-ejercicios-mas-creativo-tus-ideas-fluyan-mas-rapido
(created by Guilford, 1967)

Inspiration

A.7 The 30 Circles

Mental   *Adapted:* Aleix Barrera, Diego Castro,   *Facilitated by the Teacher*
David Rodriguez-Gomez

The aim is to avoid self-censorship in the creative processes.

10-20 min.   15 – 30 students   Virtual whiteboard

Steps

1. Ask each student to find a blank piece of paper and have them draw 30 black circles on the paper.
2. The students are challenged to fill in as many circles as possible with the aim being quantity not quality, put heavy emphasis on the fact that it's quantity not quality you are looking for. They are given 3 minutes to complete the challenge.
   - Show them examples of things to fill the circles with by sharing your screen and showing a picture where you have filled out a few of the circles in various ways e.g., shading, drawing emojis etc.
3. The students share and reflect on the similarities there are between their circles.
4. The teacher brings the students together to discuss the following points:
   - Did you stop yourself from self-censoring?
   - When you went for quantity, did you think that your work poor or did you think you would edit it?
   - Can this activity be the basis from which creativity can flourish?

Inspiration

Inspired by: Bob McKim. Adapted from: Tim Brown
https://www.ted.com/talks/tim_brown_tales_of_creativity_and_play and
https://www.artworkarchive.com/blog/7-fun-exercises-to-quickly-improve-creative-thinkin

A.8 Complete the Incomplete Figure Test

Mental   *Adapted:* Aleix Barrera, Diego Castro,   *Facilitated by the Teacher*
David Rodriguez-Gomez

The aim is to stimulate creativity.

20-30 min.   15-40 students   Virtual whiteboard, pen & paper

Steps

1. Each participant is asked to find a piece of paper, and something to write with.
2. Each participant is either given a simple drawing from a shared pool created preemptive or is asked to draw 3-4 lines randomly on the paper. The only restriction for the lines is that all lines must touch at least one other line.
3. The students must complete the figure and title it. They are given 5 minutes to complete this, where there are no rules for how or what to draw.
4. The teacher brings the students together on the virtual whiteboard. The students share their pictures with their cameras on and reflect on the imagery, implied narrative, humor or fantasy in their work.
5. The teacher brings the students together on the virtual whiteboard to discuss the outcomes of the activity.

Reflection

Pictures maybe taken from the following website: http://provensal.com/lbb/tag/torrance-tests-of-creative-thinking/),

Inspiration

Inspired by: The Torrance Test of Creative Thinking: http://provensal.com/lbb/tag/torrance-tests-of-creative-thinking and https://www.artworkarchive.com/blog/7-fun-exercises-to-quickly-improve-creative-thinking

A.9 One Minute Paper

Mental   *Adapted: Calum Crosbie*   *Facilitated by the Teacher*

The aim is to illustrate the importance of reflection and reinforcement in learning.

30 min.   15-30 students   Virtual whiteboard

Steps

1. The teacher gives prompts for the activity so that students can reflect on their learning, for example:
   a. What was the most important idea that you studied yesterday?
   b. What was the most confusing thing that you studied yesterday?
2. Students should write a one-minute paper evaluating their learning writing down at least 4 evaluative points about their learning.
3. The teacher creates 2 columns on the virtual whiteboard – 'Strengths' and 'Weaknesses'. The students reflect on their points and write them under the appropriate headings.
4. The class discusses the points on the virtual whiteboard and highlights strengths and suggests ways to solve the weaknesses.

Reflection

The activity shows the importance of the reflection and 'not knowing' in the learning process. It encourages student engagement as it highlights areas where students may require help. Students gain confidence from reflecting on the initial learning process, which allows them to develop to advanced issues.

Inspiration

Inspired by: Cross and Angelo (1988)

https://oncourseworkshop.com/self-awareness/one-minute-paper/
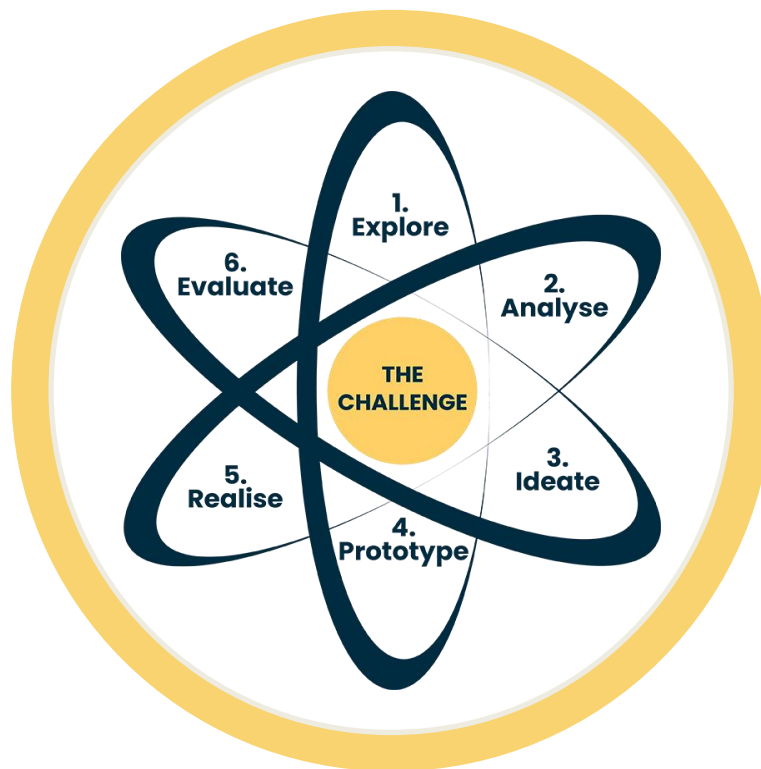
B.   Social

In the core of the Atom Model, students work with solutions for real hyper-complex problems and for them to dare to present creative solutions. It is our experience that within the social learning spheres, it is essential that security and mutual trust among group members is present.

The social learning Sphere is primarily perceived as the social relations and the collaboration area between students. The building of social relations positively encourages the students to take part in the innovative processes and supports them in working within the elements of the Digital Atom Model. Therefore, it is essential for the lecturer to facilitate good relations amongst the students and to choose some activities that develop the social learning sphere around the atom. Building a good social sphere includes giving the students constructive feedback in terms of the social aspects in the innovation process when working with the 6 elements of innovation.

The goal of the social learning sphere is to create a platform which forms the basis of the manner of collaboration in the group of students and strengthens social relations. Since the students are working together in the same groups with the same challenge through the 6 elements of the Digital Atom Model it is important to build good social relations in order to feel safe to share the uncertainty of the innovative process. Social relations are essential elements that students need during the uncertain innovative learning processes.

B.1 Code of Collaboration

Social   *Author:* Anni Stavnskær Pedersen   *Facilitated by the Teacher*

The aim is to create a code of collaboration to strengthen the social relations within a group during the innovative learning processes. The group can be a project-group or a class.

1-2 hours   5-30 students   Virtual whiteboard

Steps

1. The students are asked to write down (on computer/paper), what they think are the most important elements that make up a good learning experience.
2. The students share their thoughts with the rest of the class, either vocally or on a shared virtual whiteboard/Padlet.
3. The teacher stresses the importance of sharing their perspectives and valuing them, so they understand one another and the different needs they may have.
4. The teacher and the students create learning objectives which all students should respect. These are made into a 'code of collaboration' which all students must agree to, and digitally sign.
5. The teacher uploads the code in the class's digital folder, where it is accessible to all.
6. The teacher and the students should review and adjust the code after periods of conflict and discussions about changing expectations.

B.2 Check in

Social   *Author:* Anni Stavnskær Pedersen   *Facilitated by the Teacher*

The aim is to encourage the development of social relations in the social learning space to prepare the students for the innovation process. This activity creates a 'safety net' for students and may also contribute to improve student focus on the task at hand.

20-30 min.   2-40 students   Virtual whiteboard

Steps

1. The teacher uses a number of methods to encourage as many students as possible to speak on how they feel about a learning topic. The participants are asked to write an "S" in the chat if they want to speak up about the topic at hand, or a "Q" if they have a question to what the current speaker is saying. Find other abbreviations as needed for either language or other. It is essential that the students who are not speaking are respectful and listen attentively to the individual speaking, however, they are permitted to ask questions.

2. Students are asked to share their thoughts, feelings and concerns using the following prompts for their answers:

   - How are they feeling right now? Do they have any private, professional or practical concerns, which may influence the lesson?
   - Do they have any particular questions concerning the day's topic, which they would like to ask?
   - Do they have any information or knowledge they wish to share regarding the day's topic?
- If the lesson is part of a course, the students may take time to reflect on the course and the latest lesson. Are there any reflections from the latest lesson regarding materials used or how lessons were taught?

Reflection

After each lesson, the teacher may appoint students, who are responsible for preparing something that builds the online community for the class which should take ten to fifteen minutes to complete.

B.3 What is Your Childhood Dream?

Social   *Author:* Anni Stavnskær Pedersen   *Facilitated by the Teacher*

The aim is to create social connections between the students.

10-20 min.   2-40 students   Breakout rooms

Steps

1. The teacher asks the students to pair-up by reverse alphabetical order. So, the first in the alphabet is paired up with the one last in the alphabet.
   - E.g. Adam, Donna, Ben and Zoe. Adam and Zoe pairs up and Ben and Donna
2. The teacher has made breakout rooms beforehand so the students can go to their own with one single click.
3. The students think about their first childhood dream.
4. The students work in pairs in breakout rooms and tell each other about their dream.
5. The teacher discusses the outcome of the activity with the students.

Reflection

If possible, the students could change their pairs several times.

Inspiration

Inspired by: Lotte Darsø

B.4 If I Were A ...

Social   *Author:* Anni Stavnskær Pedersen   *Facilitated by the Teacher*

The aim is to improve student relationships by using creative presentation methods to prepare them for the Digital Atom Model.

5-10 min.

5-30 students

Breakout rooms

Steps

1. The teacher pair up the students before the lesson with this tool and make breakout rooms. https://www.randomlists.com/team-generator
2. The students are asked to imagine themselves as an object and set the category it could be vegetables, fruits, cars, cartoon-figures, tools a piece of furniture and so on.
3. The teacher prepares the students by demonstrating the activity. Give as many details as possible, for example "if I were a sofa, I would be comfy, with space to accommodate all who are present…."
4. The students work in pairs and describe themselves to each other as the chosen object.
5. Have an open discussion in the digital class afterwards and discuss both the outcome, and how the student felt about the activity.

Reflection

Some will find this activity difficult or a bit stupid, so it is important that the teacher gives a good example to help the students to complete it. The teacher can change the nature of the object.

B.5 Anecdote - 'The Story'

Social   *Author:* Aleix Barrera, Diego Castro,   *Facilitated by the Teacher*
David Rodriguez-Gomez

The aim is to identify similar and divergent characteristics in team actions.

30-60 min.

20-40 students

Padlet and virtual whiteboard

Steps

1. The teacher briefly describes a situation in the form of a 'case study'. This situation must represent a typical organizational moment, scenario, or context (e.g., some kind of conflict that usually occurs or an anecdote that can plausibly occur). The description of the case must specify the starting situation, the processes to deal with it and the decisions and the solution adopted.

2. After the presentation of the anecdote (or 'case'), each of the group members must specify individually:
   - 1st: what would they do in a similar situation and why?
   - 2nd: what would they do differently and why?

3. The teacher collates all the answers to the first question and groups the responses that are similar. The teacher then collates all the responses that are different, discordant or contradictory.

4. The groups analyze the actions that are most pertinent to the organizational model and institutional culture and reach a consensus on collegial action to be taken.

Reflection

This type of activity can help students to identify and diagnose the culture of the team and to enable them to act to improve some cultural practices. It also allows for the analysis of the degree of coherence in the team culture which guides actions and strategies.

B.6 The Object Box

Social   *Author:* Aleix Barrera, Diego Castro,   *Facilitated by the Teacher*
                     David Rodriguez-Gomez

The aim is to strengthen mutual knowledge and group cohesion.

20-30 min.   5-30 students   Virtual whiteboard, and things
                                                                from the household

Steps

1. Each participant is asked to select a number between 1 and the number of participants in the class.
2. Each participant is asked to select a personal object from within their household and write the name of the object in a shared document.
3. A participant is then asked to tell what number they chose. The participant is then asked to say what object corresponds with the number they chose on the list and say whom it might belong to and why. If it's their own object they should take the next item on the list.
4. The owners of the object identify themselves and explain why they selected the object. The other students can ask questions from the owner of the object.
5. The participant, which object was just chosen then takes his or her number and uses the same method as in Step 3.

Reflection

An alternative is to replace the object with a photograph of childhood.

B.7 Yes, but… versus Yes, and……

Social   *Adapted:* Aleix Barrera, Diego Castro,   *Facilitated by the Teacher*
David Rodriguez-Gomez

The aim is to warm-up and set the tone of the meeting.

10 min.

16-30 students

Breakout rooms in Teams/Zoom

Steps

4. The students work in pairs (labelled A and B) to complete this activity. The pairs will click themselves out into the breakout rooms.
5. Student A suggests doing something with Student B, who must answer with a reason not to do it, starting with "Yes, but …"
6. Student A responds with a counter-suggestion also using "Yes, but …" For example:
    - Student A: "Let's go to the grocery store."
    - Student B: "Yes, but our refrigerator is broken."
    - Student A: "Yes, but we still need to eat."
7. Student A suggests, but now Student B answers with "Yes, and …" For example:
    - Example: Student A: "Let's go to the grocery store."
    - Student B: "Yes, and let's get avocados."
    - Student A: Yes, and let's make guacamole."

The students in the breakout rooms form a group and discuss what they have learned from the activity. The teacher has beforehand prepared questions the students must answer when they finished the exercise. 1) Ask the students how the different tasks made them feel when the response changed from "Yes but", to "Yes and". 2. Did they feel more empowered in their idea, or energized in the way they responded? 3. Did they see barriers or opportunities?

*Inspired by:*https://voltagecontrol.com/blog/the-best-design-thinking-exercises-for-any-phase-of-a-project/

Inspiration

B.8 Keep talking behind my back

Social *Author: Jonas Ørts Hansen* *Facilitated by the Teacher*

To create an environment where the students feel safe sharing their expectations and/or concerns.

30 min.

20-40 students

Breakout rooms in Teams/Zoom

Steps

1. The students are presented with a discussion topic regarding the digital learning space. This could be
   - What is important for me to feel safe in a digital environment?
   - What is important that my co-student does so that I feel motivated?
   - How do I want to contribute to the social environment?
2. Each student writes down (computer/paper) one sentence regarding the discussion topic.
3. Pair the students into groups of 3 persons per group using
   https://www.randomlists.com/team-generator
4. Student A presents their sentence to student B & C.
5. Student B & C have 5-10minutes to discuss the sentence presented by student A. Student A is not allowed to interrupt the discussion but is only allowed to take notes and listen/observe the discussion.
6. After the time is up (the 5-10minutes) the seats are swapped, and student B presents a topic for A & C to discuss.

B.9 From 16 down to 1

Social *Adapted by:* *Jonas Ørts Hansen* *Facilitated by the Teacher*

To be innovative, it's important to know your strengths and weaknesses, but also understand your peers. Can be used as a starting point for project groups to get to know each other before working together through the 6 elements.

1,5-2 hours

20-40 students

Teams/Zoom

Steps

1. Start with a brief introduction to personality traits, and what that can mean for both a group setting, but also what it means to be innovative.
2. Have all the students fill out the personality test on www.16personalities.com
3. Give the students 20 minutes to read the 'Strength and Weaknesses' and 'Workplace Habits' sections and take notes of the most and least accurate to how they see themselves. If they have time left, they can read some of the other sections too.
4. Put the students into groups using https://www.randomlists.com/team-generator and give them 30minutes to discuss what they think this personality means for them in a project setting.
5. This exercise can be a starting point for the project-group that work together during the 6 elements in order to let them get to know each other. The perfect group size 2-4.
6. In plenum have the students talk about what they learned of this exercise, and what they think they can use from this information regarding solving problems, both alone as in groups.

Inspiration

www.16personalities.com

B.10 Know the role

Social   *Adapted by: Jonas Ørts Hansen*   *Facilitated by the Teacher*

To let the student get a feeling for group/business dynamics and what aspects are important. Can be used as a starting point for project groups to get to know each other before working together through the 6 elements.

1,5-2 hours

5-40 students

Teams/Zoom

Steps

1. Start with a brief introduction to personality traits, and what that can mean for both a group setting, but also what it means to be innovative.
2. Have all the students fill out the personality test on www.16personalities.com
3. Ask the students to think of all the different roles/responsibilities they can identify in regard to group work/business. There are no boundaries on which roles are allowed to write down.
4. Have the students gather in their project groups (use breakout rooms) and write up all the roles they have written down.
5. Have each group map out what roles they have internally in the group. One person can have more than one role.
6. Have each group discuss internally which of the unfulfilled roles are important to fill out, and how they want to fill out that role.
7. Have a class discussion regarding roles, and what roles are important for a group to be successful.
8. Have a discussion on the topic of how to fill a role that is not naturally within the group.

Inspiration

www.16personalities.com

4.   Atom Activities
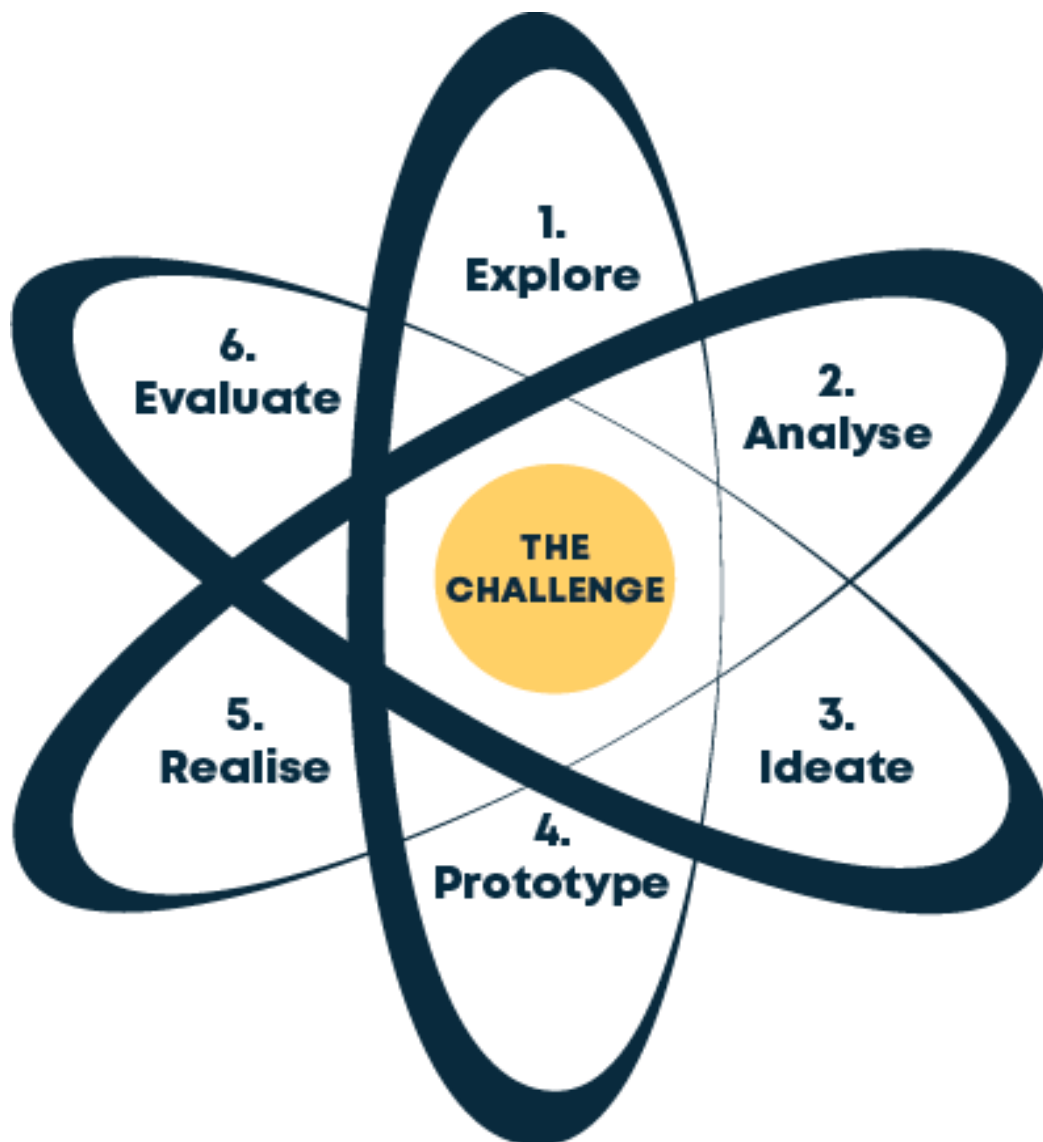
THE CHALLENGE

At the core or nucleus of the model, is the challenge. It is what the students and teachers throughout the whole process of working with 'real life projects' must initiate from and return to- therefore it has a central place in the model. Challenges, as such are characterised by originating from 'the field', and can be problems, potential development trails and hacks to future change. Phenomena that can be observed on all systemic levels in society, organisations, and companies/enterprises.

When working with the digital Atom Model and the six elements must the teacher prepare groups so the same students can work together with the same challenge. The challenge is in the core of the Digital Atom Modell process. It is what the students and teachers throughout the whole process of working with 'real life projects' must initiate from and return to. For the chosen units of students, it will in other words steer the rest of the innovation process working with the challenge in challenge-based learning. The digital atom model is based on challenge-based learning. That means that the core of this work is to find a challenge. It can be done by the teachers before the lesson, or it can be done together with the students. The inspiration for the challenge can come from a lot of different places.

4.0.1 The 5 Whys

Challenge   *Adapted: Ilse Fraussen*   *Facilitated by the Teacher*

The aim is to identify the underlying cause of the challenge to create an optimal solution for it.

10-20 min.

20-40 students
4-8 groups

Virtual whiteboard,
breakout rooms

Steps

1. The teacher makes groups of 2-5 before the lesson and write them down on the virtual whiteboard.
2. The teacher draws five boxes – one below the other – on the virtual whiteboard and explains the use of the 5 Whys.
3. The students, or the teacher, define a problem with a product and create a draft statement for the challenge.
4. The groups rewrite the challenge as a 'Why' question and put it in the first box e.g., if the challenge is how can we stop the icecaps melting? This should be rewritten as 'Why are the icecaps melting?'
5. The groups answer the question and write it as a 'Why' question.
6. The students repeat the process 5 times to reach the reason for the problem in the challenge.
7. The students review the 'Why' answers which will identify the nature of the challenge.

Reflection

This activity will identify the underlying cause of the challenge in order to identify the real problem we are dealing with.

Inspiration

Inspired by: Inspired by: SakichiToyada – the inventor of Toyota Industries-
https://www.mindtools.com/pages/article/newTMC_5W.htm

4.0.2 The 5 W's – Who? – What? – When? – Why? – Where?

Challenge   *Adapted: Ilse Fraussen*   *Facilitated by the Teacher*

The aim is to get clear view of the challenge by identifying key information.

10-20 min.

20-30 students
4-15 groups

A virtual whiteboard

Steps

1. The teacher creates groups of 2-5 students before entering the process.
2. The teacher creates five boxes on the virtual whiteboard. Each box should contain one of the five following questions:
   - WHO is involved in the challenge, who is it meant for and who will make decisions?
   - WHAT do you want to achieve in the challenge, what do the customers want, what is the context and what is the purpose?
   - WHEN does the challenge start and when does it have to be delivered?
   - WHY is the challenge important and why are you involved in it?
   - WHERE will the product be used?
3. The students review the questions and put their answers in each of the boxes.
4. The students review the answers and identifies key information for the challenge.

Reflection

The activity could be done using online tools such as Padlet, Trello, a virtual whiteboard and breakout rooms in Teams/Zoom.

Inspiration

Inspired by: https://www.mindtools.com/pages/article/newTMC_5W.htm

4.0.3. Formulation of a Challenge

Challenge   *Author: Anni Stavnskær Pedersen*   *Facilitated by the Teacher*

The aim is to formulate the challenge so that it is easy to work with.

10-20 min.   20-40 students   A virtual whiteboard, breakout rooms

Steps

1. The teacher and students create a challenge in a virtual whiteboard that must be:
    - concrete so that it is manageable to allow ideas to be generated for solutions.
    - in the form of an open-ended statement /question to allow it to be explored.
    - in a format that enables students or external collaborators to realize or act on in the future.
2. The teacher asks the students to write down (computer/paper) the following three questions to which they should refer to throughout the activity:
    - How do I/we/the organization create ...?
    - How do I/we/the organization get …?
    - How do I/we/the organization develop …?
3. The students write their month of birth in the chat, and are paired up in groups of five with the same month/or closets to
4. The students start working in their groups to formulate a challenge e.g. How do we create..?
5. The groups are paired together and present their ideas to each other. They give feedback to each other focusing on the 3 criteria above.
6. The students reflect on the feedback and 'thought-shower' to create their challenge. ¨
7. The formulated challenges are shared on the virtual whiteboard, and the teacher or the students choose a challenge they want to work with in the 6 elements of the Digital Atom Model.

Reflection

It is essential to have a clear formulation of the challenge in the core of the digital Atom Model since the content circles around that. The challenge should be visible throughout the entire process in the class and in the innovation process. You could ask the students to write it on paper, or you could share it on the virtual whiteboard if the class shares a challenge. If it is group-based challenges the groups can share it in their breakout rooms/Teams rooms.

4.0.4. Find your Challenge.

Challenge   *Author: Anni Stavnskær Pedersen*   *Facilitated by the Teacher*

The aim is to identify the challenge.

10-20 min.	20-40 students	A virtual whiteboard, pen, paper

Steps

1. The students pair up with someone who has the same shoe size as them (Get the participants to write their shoe size in the chat to match them up).
2. The students ask each other questions about challenges in their lives e.g. (They have 10 minutes to complete the task)
   - Things that they find annoying.
   - Getting up in the morning
   - Finding every item - socks, mobile etc.
3. The students are sent out in breakout rooms.
4. Students take turns to ask each other questions about things they find annoying. Students should take note (computer/paper/in the chat) of all their answers.
5. The students change partners by one staying in the breakout room, and one moving 1 room further and repeating the exercise again taking notes of all their answers.
6. The students review all their answers and write down the three things they find most annoying on the shared whiteboard and place all their comments on the virtual post-it wall.
7. The students review the comments and find the one thing they would be most happy to find a solution to.
8. All the students formulate a question for their challenge.

Reflection

Depending if the teachers want the students to work in groups or as a class, the students can vote on how many questions/challenges they want to bring to the next phase.

4.0.5. Where to Find a Challenge?

Challenge   *Author: Anni Stavnskær Pedersen*   *Facilitated by the Teacher*

The aim is to identity the origin of a challenge.

2 hours – 2 days

20-40 students
4-8 groups

Whiteboard, computer,
pen, paper and post-its

Steps

1. The digital Atom Model is based on challenge-based learning. That means that the core of this work is to find a challenge. It can be done by the teachers before the lessons, or it can be done co-creative together with the students. The inspiration for the challenge – can come from a lot of different places.

2. Suggestions for a challenge could come from any of the following – this list is not exhaustive:
   - An external organization which wants to collaborate with students on a challenge (some of them available at https://www.demind.eu/ and https://www.foremlink.com).
   - The project group's knowledge, experience and skills gained from an internship.
   - A societal issue that demands new solutions.
   - An everyday problem that students identify. (See activity 0.4)

3. If the teachers choose to have the students as part of deciding the challenge. The project group 'thought-shower' their ideas for a challenge and write on a shared Virtual whiteboard. They group any similar challenges together.

4. The project group then considers possible skills and limitations that they have. They should write each one on a separated digital post-it and place it beside the appropriate challenge suggestion on the digital white board. The teacher explains that the challenge should be substantive and follow the criteria for selecting a challenge (Focusing on the Challenge Formation Activity: 0.3).

5. The students write down the criteria and then discuss where they should be placed on the wall.

6. The students should then be able to clearly identify a substantive challenge.

7. If the teacher chooses for the students to have a shared challenge in the class, the teacher can decide, or the students can vote which challenges they want. If the teacher want the students to have different challenges to solve in the class, the teacher can let the students write their names on the challenges they want to work with and make project-groups from this information.

4.0.6. The Challenge and Group Formation

Challenge   *Author: Anni Stavnskær Pedersen,*   *Facilitated by the Teacher*
Ann-Merete Iversen

The aim is to identify engaging challenges and create appropriate groups for the challenge. This exercise can be used if the teacher wants students to be part of defining the challenge.

2-3 hours

10-50 students
2-15 groups

A virtual whiteboard
and breakout rooms

Steps

1. The students identify ideas for challenges and write these on the left-hand side of the virtual whiteboard. The students read aloud each other's ideas from the whiteboard.
2. The students categorize the ideas and place them together on the right-hand side of the whiteboard. They then create appropriate headings for each of the groupings on a new virtual whiteboard.
3. The students place the ideas under the appropriate heading on the new whiteboard.
4. The students write their shoe size in the chat and are paired up in groups of three - four with the same size/or closets to.
5. The students now spend time reviewing the ideas under each heading in the groups - 'Shopping for ideas' - discussing the ideas with other group members using a "Yes and ..." strategy to develop their thinking about the challenges. (This stage should take approx. 30 minutes).
6. The students identify the challenge which they are interested in working with. Their choice should be based on the 'possibilities' that the challenge offers and not the solution to it.
7. Students write their chosen challenge on the virtual whiteboard under the 'challenge' heading. This will form working groups for each challenge. If several students choose the same challenge, they should be divided into smaller or subgroups for the challenge.

Reflection

Students will develop their ideas for challenges by finding inspiration acknowledging others' ideas and thoughts. Project groups will contain students who share a similar passion for the same challenge, which will create good working relationships.
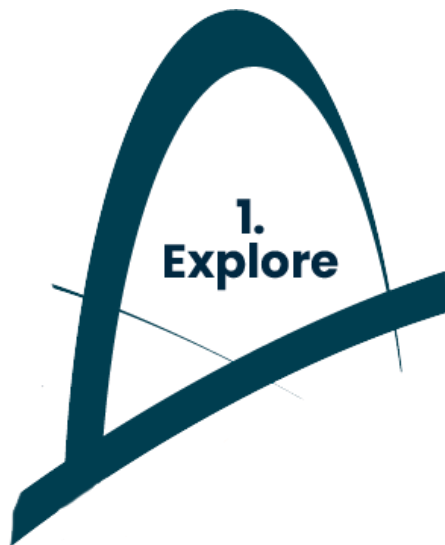
4.1. Explore

An exploration in the field of investigation takes place in order to sense and be able to properly identify the challenges of the field, if possible, through physical presence and/or virtual conditions. Inspiration can be drawn from research methodology, social technologies and social engineering. The purpose is to gather a broad range of data that will enable the participants to experience the challenge from an inside perspective.

The aim is to achieve a sufficiently deep understanding of the challenge itself and of the field surrounding the challenge. You want to look for the 'not-obvious', or the unknown, which is a fruitful path to innovation.

Since the remote nature of D-EMIND it's important to acknowledge some of the constraints in doing a remote exploration of a challenge. The fact that it's remote puts on constraints by the merit that it is not possible to fact check the information you gather, with a personal experience. Some of the explorations therefore must take the information gathered as fact, with no way to test the claims.

It's important to understand that this does not undermine the core challenge, nor the solution in the end, but it will have an impact on assumptions throughout the process.

4.1.1. Target Group Interview

Explore   *Author: Anni Stavnskær Pedersen*   *Facilitated by the Teacher*

The aim is to gain a deeper understanding of the challenge and the target group.

30-60 min.

5-50 students
1-15 groups

Virtual whiteboard, voice recorder, pen & post-its

Steps

1. The students identify suitable candidates for interview by thinking about the following:
   A. Who can provide valuable information about the challenge?
   B. Who can provide background for the challenge?
   C. Who can provide a deeper understanding of the challenge?
2. The teacher aids the students in creating an interview guide, making sure that the student focuses on getting relevant information from the candidates.
3. The students make an appointment for a digital meeting with the focus-person.
4. The students complete the interviews using the interview guide.
5. The students analyze the interviews and identify the relevant information for the challenge and post it on the virtual whiteboard.
6. The teacher aids the students in reviewing the challenge and discussing what knowledge they have acquired from the interviews.
7. The students then decide whether to adjust the challenge.

Reflection

This activity gives students insight into the target group by identifying candidates for interview and by creating relevant questions. It also supports the development of the students' methodology and analytical skills.

Inspiration

Inspired by: Simon Sinek: https://www.smartinsights.com/digital-marketing-strategy/online-value-proposition/start-with-why-creating-a-value-proposition-with-the-golden-circle-model/

4.1.2. Station to Station

Explore   *Author: Calum Crosbie*   *Facilitated by the Teacher*

The aim is to formulate the challenge.

20 min.

4-10 groups

10-40 students

Virtual whiteboard and Padlet

Steps

1. The teacher places resources about the company at 'stations' in Padlet
2. The students go round each station collecting information on the following:
   - the client's/company's profile
   - the target group for the prototype
   - possible resources/materials for the challenge
3. Students post their research findings on the virtual whiteboard or Padlet.
4. The students review the information and group it together on the whiteboard/Padlet.

Reflection

This activity develops the students' skills in filtering out unnecessary information and directing it to the challenge. It raises awareness for the need for a variety of different resources to complete the challenge which could stimulate innovative thoughts in the ideate and the realize phases of the projects.

4.1.3. My Ever-Changing Mood

Explore   *Adapted: Calum Crosbie*   *Facilitated by the Teacher*

The aim is to explore students' feelings towards challenges.

20 min.

20-40 students
4-10 groups

A virtual witheboard/Padlet
and set of challenges

Steps

1. Each challenge gathered through the activities in the challenges elements should be presented one at a time to the students in Padlet/virtual whiteboard.
2. The students are asked to select a mood card from the list in Padlet that best highlights their mood towards a challenge.
3. The students write their reaction to each challenge – anonymously - on the shared whiteboard.
4. This process should be repeated with the remaining challenges.
5. A discussion then takes place to analyze the students' responses to each challenge.
6. The students then select the challenge that they want to attempt.

Reflection

A group consensus should emerge that will increase students' motivation levels as the selected challenge will create a positive mood amongst the students. It should be stressed during the activity, that moods are ever-changing, and that the nature of the learning task can have a significant impact on one's emotions at one time.

Inspiration

Inspired by: Andrea Harrn (2015) – The Mood Cards

4.1.4. What do I even know?

Explore   *Author: Jonas Ørts Hansen*   *Facilitated by the Teacher*

To make the students explore a problem from different perspectives.

1 hour

20-40 students
4-10 groups

Interviews or written "scripts" from a client of a challenge.
Breakout rooms

Steps

1. The students are divided into random groups of between 3 and 4 per group by using https://www.randomlists.com/team-generator
 (If they have project groups use those).
2. Each group member is given a different interview/story regarding a challenge they are to discuss. (If possible, try to hide the fact that they will not be reading the same interview/story).
Give the students 10 minutes to read the given interview/story. Send the groups out into breakout rooms.
3. After the students have read the paper have them discuss the challenge. Emphasize they are to use the information they have just read in this discussion.
4. After the set time is up, the class discusses what they experienced and how they felt about talking about a subject where they only knew a little bit of the information.
5. To conclude the activity, emphasize that no matter what problem the students are to tackle it's important to hear the perspectives from every person involved in the challenge. From CEO, middle management, to the "employee on the floor". All have valuable information towards the challenge.

Reflection

For this exercise to work, it will require a great deal of preparation from the teacher.
This involves both having interviews/scripts from different people revolving the challenge.

4.1.5. Whiteboard rotation

Explore   inspiration: www.sessionlab.com   Facilitated by the Teacher

Using multiple virtual whiteboards, participants float to different whiteboards to add their thoughts, contributions, or questions. Final whiteboards are discussed and reviewed.

10-30 min.

20-40 students
4-10 groups

A virtual whiteboard

Steps

1. Decide on the different topics the challenge must be explored on

2. Set up as many rooms with a virtual whiteboard/Teams as you have different topics.

3. Share the different rooms with whiteboards with all participants.

4. Every participant visits each room with whiteboard to contribute assigned information: questions, opinions, processes, ideas, … The participant can look at the information which is already written on the whiteboard and can decide if he/she wants to add additional information, critical questions, pictures, …

5. Recommendation: Assign a specific amount of time for the entire session giving average times for each whiteboard, or create an announcement when participants must move on to the next whiteboard

6. After every whiteboard has been visited by all participants, start a full room discussion based on the information on the completed whiteboard. If necessary additional information can be added

Reflection

Virtual whiteboards can be used for this, also Trello or Padlet can be used.

By dividing the topics over different rooms, participants have a chance to look at information other students have already shared and they can build further on that information. Every participant has a chance to think about the topics individually, making the final whiteboard a result of individual effort complemented with a group discussion.

4.2. Analyse

An analysis is conducted on the basis of the collected data. Theoretical perspectives can be added in order to develop a deeper understanding of the challenge- its origin and its components. The analysis is a gateway to a clarification of the underlying question of the challenge. This question serves both as a driving force and the project core and must take the form of an open-ended question.

The aim is to identify patterns and to achieve an in depth understanding of the challenge. It is imperative to undertake a careful analysis in order to avoid quick fixes and obvious answers to the challenge.

4.2.1. The 5 Whys

Analyse   *Adapted: Ilse Fraussen*   *Facilitated by the Teacher*

The aim is to identify the underlying cause of the challenge to create an optimal solution for it.

10-30 min.

20-40 students
4-10 groups

A virtual whiteboard, Padlet

Steps

1. The challenge as defined from earlier are written as a "why" question e.g., if the challenge is how can we stop the icecaps melting? This should be rewritten as 'Why are the icecaps melting?'
2. The students are divided into groups by using https://www.randomlists.com/team-generatorg
3. The groups answer the question and write it as a 'Why' question.
4. The students repeat the process 5 times to reach the reason for the problem in the challenge.
5. The students review the 'Why' answers which will identify the nature of the challenge, and uses this to pursuit more information about the challenge.

Inspiration

Inspired by: SakichiToyada – the inventor of Toyota Industries-
https://www.mindtools.com/pages/article/newTMC_5W.htm

4.2.2. The 5 W's and 1H: Who? – What? – When? – Why? – Where? -How?

Analyse   *Adapted: Ilse Fraussen*   *Facilitated by the Teacher*

The aim is to analyse important information to develop a clear overview of the challenge.

10-20 min.   10-40 students
                    5-15 groups   A virtual whiteboard

Steps

1. The students are divided into groups of 5-15 by using https://www.randomlists.com/team-generatorg
2. The teacher creates 6 boxes on the virtual whiteboard. Each box should contain one of the 6 following questions (the list of questions within each level is not exhaustive):
   - **WHO** is involved in the project, who is it meant for and who decides?
   - **WHAT** do you want to achieve, what do the customers want, what is the context and what is the purpose?
   - **WHEN** does it start, when does it have to be delivered and when does the problem occur?
   - **WHY** is a solution important and why are you involved in the project?
   - **WHERE** will this be used and where will it take place?
   - **HOW** does it work, how will it look and how much will it cost?
3. The groups review the questions and put their answers in each of the boxes.
4. All the students analyse the answers and discuss if they add clarity to the challenge.

Reflection

The challenge created should be a single sentence so that it is clear to all group members.

Inspiration

Inspired by: https://www.mindtools.com/pages/article/newTMC_5W.htm
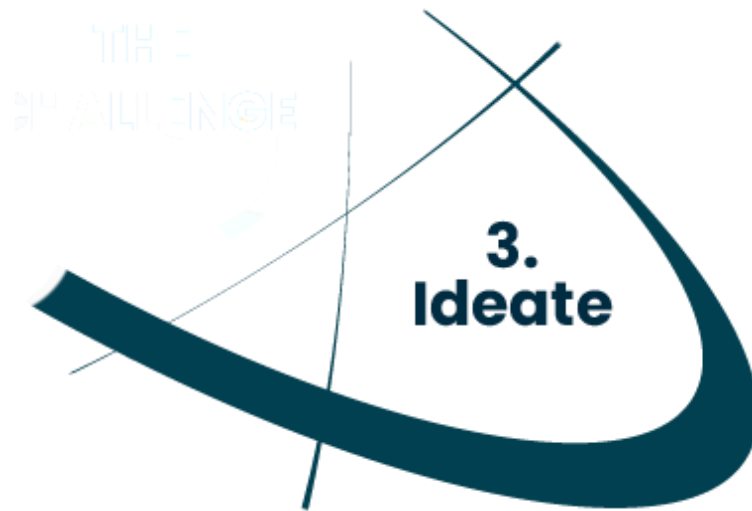
4.3. Ideate

Ideating is about creating innovative solutions to the challenges. In order to foster an innovative mindset and entrepreneurial skills in the participants, the process is facilitated through innovation and creativity-promoting methods. Inspiration for the idea generation process is drawn from design thinking, lateral/horizontal thinking, arts-based methods, social technologies, co-creation methodology, communication tools and so on. After the generating of ideas, a 'sorting of ideas' takes place. The different ideas are discussed in the light of the themes and specifications, and the ideas the students wish to continue with are chosen.

The aim is to unleash creativity in the participants and to generate new ideas drawing on a broad field of knowledge and approaches. Remember that the challenge is in the centre of the process. And must be visible during the whole ideation process for both students and teacher.

4.3.1. Adapt-A-Role

Ideate *Adapted: Aleix Barrera, Diego Castro,* *Facilitated by the Teacher*
David Rodriguez-Gomez

The aim is to promote the ability to empathize with users or recipients.

30-60 min.

10-45 students

A virtuel whiteboard

Steps

1. The students are asked to pick any superhero, comic character, celebrity, scientists, famous athlete etc. They are not told the reason for this beforehand. Ask them to write down their chosen character in the chat or on the virtual whiteboard, so it is visible for the class.
2. The teacher outlines the task to the students:
   a. As Polman and Emich (2011) state, decisions made by others are more creative than decisions made by ourselves.
   b. This activity, developed by Gumula (2020), proposes a brief exercise before the typical 'adapt-a-role' technique used in the ideation phase of Design Thinking.
3. The students imagine their persona solving the issue, problem or task and take notes of any important information or steps identified.
4. The students then solve the challenge with the character they have chosen.
5. The teacher discusses this approach to solving-challenges with the students.

Inspiration

Inspired by: Gumula, J. (2020). Creativity training in organizations: a ready-to-implement concept. Gruppe. Interaktion. Organisation. ZeitschriftfürAngewandteOrganisationspsychologie (GIO), 51, 95-102.
Polman, E., &Emich, K. J. (2011). Decisions for others are more creative than decisions for the self. Personality & Social Psychology Bulletin, 37 (4) pp. 492-5601.
https://doi.org/10.1177/0146167211398362v

4.3.2. User Journey Map

Ideate   *Adapted: Aleix Barrera, Diego Castro,*   *Facilitated by the Teacher*
David Rodriguez-Gomez

The aim is to visualise the process that a person or user goes through to accomplish a goal.

1 hour

10-40 students

Whiteboard, pen, paper and post-its

Steps

1. The teacher explains what the purpose of a Journey Map is and why it is important to create one.
2. The Team members identify and compile a series of user actions into a timeline - they should try to narrow it to 8-15 actions. (15-20 mins)
3. Participants should now group all the actions into phases (3 to 7 phases in total) and label them from the users' perspective. (10-15 mins)
4. Participants must now think about the user's thoughts and emotions which could promote or inhibit progress in each action and/or phase. (15 -20 mins)
5. Participants should try to organize and visualize all the ideas of their user journey map - they can draw it or use post-it notes(computer/paper). (10 mins)
6. The facilitator should spend time at the end to share and reflect on the different maps with the groups.

Inspiration

Inspired by: *https://www.nngroup.com/articles/journey-mapping-101/* and *https://careerfoundry.com/en/blog/ux-design/design-thinking-workshop/*

4.3.3. Conceptual Blending

Ideate   *Adapted: Ilse Fraussen*   *Facilitated by the Teacher*

The aim is to create innovative ideas by making combinations.

20-30 min.

10-40 students
2-5 groups

A virtual whiteboard
and pen, paper

Steps

1. The students write down the key word of the challenge in the middle of a piece of paper/personal whiteboard.
2. The students write down the first words that come to their minds when they look at the keyword. They should identify several words to create a 'word cloud'.
3. The students make links between all the words on their pages/whiteboard.
4. The students pick 2 words out of their 'word cloud' and combine them into 1 idea.
5. The students make a rough drawing of this idea and if necessary, add some explanation to it.
6. This process should be repeated with 2 other words.
7. The teacher discusses the ideas created with the groups.

Reflection

The challenge should be as clear as possible for the students to understand.

Inspiration

Inspired by: http://www.ideasforideas.com/

4.3.4. Reverse Brainstorm

Ideate   *Adapted: Ilse Fraussen*   *Facilitated by the Teacher*

The aim is to think of solutions which could make the problem worse, then reverse them by turning them into new innovative solutions.

20-30 min.

10-30 students

A virtual whiteboard, pen, paper and phone

Steps

1. The challenge is written on the virtual whiteboard in a simple sentence.
2. The challenge is then reversed e.g., if the challenge is 'How can you reduce number of fatal car accidents?' this becomes 'How can we cause more fatal car accidents?'
3. The students think of ideas which offer a solution to this reversed challenge. How can you make the problem worse instead of better or finding a solution for it?
4. The students write down their ideas however they like phone/paper.
5. When the students have created a 'more damaging ideas' list, they then turn them around i.e., turn these ideas into positive ones. In this way, students will create a list of solutions for the original challenge.
6. The teacher discusses the ideas created with the students.

Reflection

Additional help on using Reverse Brainstorm can be found at: http://www.ideasforideas.com/

Inspiration

Inspired by: http://www.ideasforideas.com/http://www.ideasforideas.com/

4.3.5. Sticky Dots

Ideate   *Author: Ilse Fraussen*   *Facilitated by the Teacher*

The aim is to use thought-showering to quickly create the best ideas for a challenge.

5-10 min.

10-40 students

A virtual whiteboard and virtual sticky dots

Steps

1. The students thought shower their ideas for the challenge and write them on the virtual whiteboard. They should give a short explanation of each idea they suggest.
2. All ideas are collected in a shared document where all participants can edit.
3. All students are given 3 virtual "sticky dots" each which they place on the ideas they prefer. They can stick their 3 "dots" on 3 different ideas or all on the same idea. They can mark their choices with whatever symbol they would like, but it can only be 1 character per "dot".
4. After 5 minutes, all the dots on each idea are counted and the one with the most dots is the winner.
5. The students then form groups to debate why one idea was selected over the others and explain why this one was chosen.

4.3.6. Pressure Cooker

Ideate   *Author: Ilse Fraussen*   *Facilitated by the Teacher*

The aim is for the students to quickly generate ideas using their intuition.

30-60 min.   10-40 students   A virtual whiteboard, breakout rooms

Steps

1. The teacher divides the class in random groups of 3-5 students by using: https://www.randomlists.com/team-generator
2. The teacher outlines the task to the students.
   a. The pressure cooker method links fast thinking, quick reactions and the students' use of intuition. It requires the students to use their 'gut feeling' or intuition in creative thought-showering.
3. The teacher gives small tasks to the groups. All the tasks will generate answers to the same key question set by the challenge.
4. The students are given limited amounts of time to generate answers to the tasks.
5. Students can also change groups to increase the pressure.
6. The students then come together and share their conclusions with all the groups.
7. The students then together discuss the next steps of the challenge.

Reflection

This activity uses the disadvantage of having limited time to create spontaneous reactions from one's feelings. It creates a lot of fun and curiosity and may encourage students to become part of your 'task force' to work on the next part of the process.

4.3.7. Use the Word

Ideate   *Adapted by: Anni Stavnskær Pedersen*   *Facilitated by the Teacher*

The aim is to produce ideas and solutions for the challenge.

10–20 min.

10-40 students

A virtual whiteboard and virtual word cards

Steps

1. The teacher demonstrates the task to the students and shows them how to use the word generator. https://randomwordgenerator.com/
2. Each of the students pick one word by generating it themselves.
3. The teacher encourages the students to read the word and asks students to think about the following question: Do you have any ideas for the development of the solution for the challenge in the core of the model?
   - If yes – the students put down the ideas.
   - If no – the students generate another word.
4. The teacher concludes the activity and stresses that all ideas must be retained as they may prove useful for the challenge.

Reflection

If the students do not have virtual word cards, they could also make a list of 40 random words and give them numbers. The students could then pick a random number and read the word that corresponds to that number.

Words to ideate from can be found from this link: https://randomwordgenerator.com/

This activity allows the students to perceive the challenge from a different perspective. It urges students to employ lateral thinking – like divergent thinking - which involves them stepping away from the logical and linear forms of reasoning to search for original and creative solutions to problems.

4.3.8. The Idol

Ideate   *Author: Anni Stavnskær Pedersen*   *Facilitated by the Teacher*

The aim is to develop ideas that have been inspired by a role model.

5-10 min.

10-40 students

A virtual whiteboard and phone/computer

Steps

1. The students are asked to close their eyes and are asked to think of the last person who have made an impression on them. A person they look up to, who they are inspired by, who they see as a role model or an idol.
2. The students are asked what the idol would suggest in relation to the challenge in the core.
3. The teacher gives the students 5 minutes to reflect on the question. After 5 minutes the students may open their eyes again.
4. The students are encouraged to put down (on phone/computer) their ideas they thought of during the reflection period.
5. The teacher and students share and review on the virtual whiteboard the ideas generated and assess whether they are possible solutions for the challenge.

Reflection

The activity can also be carried out with the student's eyes open if it makes them more comfortable. This activity will challenge students' thinking in perceiving a problem from a perspective different to their own. In addition, the activity creates the possibility of becoming more open-minded concerning the development of ideas, as the students are tasked with thinking as someone else to generate solutions to a problem.

4.3.9. Picture Boost

Ideate   *Author: Anni Stavnskær Pedersen*   *Facilitated by the Teacher*

The aim is to stimulate innovation from picture cards to develop new ideas.

10-20 min.

10-50 students

A virtual whiteboard and virtual picture cards

Steps

1. The teacher demonstrates how to create an idea for solving the challenge by means of a virtual picture card.
2. The students are given a stack of virtual picture cards each. The cards should be shown "face down" on the virtual whiteboard so that the picture cannot be seen.
3. The students choose a card from their individual stacks and write down (phone/computer) the idea(s) the picture evokes in them. They should focus on one virtual picture card at a time. They should be allowed to spend some time considering how the picture may be related to the challenge.
4. A new card is chosen when the students cannot get more ideas from their current cards.
5. The class come back to the virtual room and discuss their ideas or alternatively upload 3 ideas from each student, and the class look at them.

Reflection

Virtual post-cards, a virtual memory game cards could also be used or click the link to find random pictures to ideate from: https://randomwordgenerator.com/picture.php

The goal is to challenge the students to develop new ideas using immediate motivation and inspiration from pictures. The pictures should surprise the students as this will hopefully challenge their tendency to think in their usual patterns.   They will then impulsively accept the first thought(s) that come to mind and develop a link between this/these thought(s) and the challenge.

4.3.10.   Countless Obstacles

Ideate   *Adapted: Anni Stavnskær Pedersen*   *Facilitated by the Teacher*

The aim is to develop solutions for the challenge when it is viewed from different perspectives.

30-60 min.   10-40 students   A virtual whiteboard and phone/computer

Steps

1. The students are asked to imagine that they are eight centimeters in height. They are given five minutes to reflect on this and are asked to generate solutions for the challenge and note their answers on their computer/phone.
2. The students place their answers on the virtual whiteboard and explain how they contribute to solving the challenge.
3. The teacher tells the students that they must incorporate the use of a smart phone to create solutions for the challenge. They should note their ideas and explain how these ideas help solve the challenge.
4. The students place their answers on the virtual whiteboard and explain how they contribute to solving the challenge.
5. The teacher explains that the challenge will be turned 'upside down' and the students generate ideas for the challenge that are flawed and useless.
6. The students write down their ideas and place them on the virtual whiteboard.
7. The students review the ideas/solutions to their challenges and identify ones that are appropriate for solving the challenge.
8. The students note down their ideas for the challenge on their phone/computer.

Reflection

This activity involves the use of lateral or divergent thinking to generate original, creative solutions to challenges. The facilitator should emphasise that it is OK if the initial inputs do not give the students any ideas for solutions. They can just wait for the next inputs to see if they generate any ideas.

Inspiration

Inspired by: This is inspired by Edward De Bono's Lateral Thinking

4.3.11.   Pass it On

Ideate   *Author: Anni Stavnskær Pedersen*   *Facilitated by the Teacher*

The aim is for the students to undertake idea generation by building upon others' ideas.

10-20 min.

10-50 students

A virtual whiteboard, breakout rooms

Steps

1. The participants are grouped into random groups of 3-5 per group by using https://www.randomlists.com/team-generator or
2. Assign one of the group members to be timekeeper.
3. All group members write down their ideas for the solution to the challenge in a shared document.
4. The teacher asks them to pass their document to the person below them in the breakout room.
5. The students add to the new document they have been handed to develop the ideas that are listed.
6. The document should then be passed to the person below in the call once again.
7. The documents should be passed to all group members until the documents are returned to their original owners.
8. The teacher asks each student to read out their original idea and the additions which the other students have added.
9. When all the students have done this all the ideas are pooled and retained for future use.

Reflection

The groups should have 3-5 members each, but you can include as many as 40 participants.

4.3.12. Gyro Gearloose

Ideate   *Author: Anni Stavnskær Pedersen,*   *Facilitated by the Teacher*
Ann-Merete Iversen

The aim is to challenge students to instantly find new connections with random elements they would not normally combine.

10-20 min.

10-40 students

A virtual whiteboard and a virtual bag with different things

Steps

1. Students are asked to find 5 different items from the household that will be used for the task They have 5 minutes to do so.
2. The teacher picks an object from a bag they have created of about 5 different random objects from the household and asks a student to do the same. Then demonstrates how to invent a 'new thing' based on the chosen object and one of the students' objects.
3. The teacher gives each student a number based on how many students there are in the class. The teacher then shouts out random numbers (e.g., numbers 5 and 13). The students with this number show their item to the rest of the class on the camera. They then generate ideas from that. The teachers keep choosing numbers for new objects to be shown to continue the generation of ideas.
4. One alternative is to let the students do this activity in pairs in breakout rooms. The students are asked to pair up with someone who has the same shoe size as them. Students write their shoe size in the chat. The students are asked to look at the things they collected from the bag. Within 3 mins, the pairs must develop ideas for the challenge; these ideas must be a combination of their two items.
5. The students then look at the two items they collected from the bag. The pairs work together and invent 'new things' which are a combination of the two items they collected from the bag. They keep going taking new items from the bag when they do not get any more ideas. The teacher set the time limit.
6. The students note down the ideas that emerged during the exercise - 1 idea per virtual post-it note.
7. The students share their ideas with the rest of the class. The teacher may also discuss how the application of a concrete object can generate some new ideas regarding the challenge.

Reflection

The bag of things/Items can be made from random house objects e.g., from a child's room, a kitchen, classroom etc. You can use any object for this activity. This activity removes the students from their comfort zones to collaboratively develop ideas for meaningful solutions to their challenges. Their creative thoughts are developed by acknowledging each other's ideas by using phrases as "Yes, and…" to develop ideas.

4.3.13. Blooming ideas

Ideate Selection   *Author: Jonas Ørts Hansen*   *Facilitated by the Teacher*

Draw upon brainstorming, in a structured way

1 hour

10-40 students
3-15 groups

A virtual whiteboard, 9x9 grid,
with clear 3x3 borders

Steps

1. The teacher creates random groups of 3-5 by using https://www.randomlists.com/team-generator
2. Each group gets a paper/document with a 9x9 grid. Make sure each 3x3 grid is easily distinguishable, either by making a little room between each 3x3 grid, or by bolding the line between each 3x3 grid.
3. Get the students to write their main challenge in the central 3x3 grid (Row 5, column 5).
4. In the surrounding 8 cells the students have to put central key points about the challenge. This should be broader topics and not specific ideas. In the central box it's important to be bold, and none-judgmental regarding ideas.
5. Put the answers from step 3 into the centre of each of the remaining 3x3 grid. So that R4C4 (A) is put into R2C2, R4C5 → R2C5, and so forth. (See illustration for clarification.)
6. Have the students generate ideas surrounding each new box, with the now, new central topic for each 3x3 grid. They are allowed to be more specific in this step.

Reflection

Draw upon different idea generating methods in the first generation of ideas (Step 3). This could be activities like *A.1 Party time, 3.1 Adapt-A-Role*, and so forth.

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4.3.14. Extreme measures

Ideate Selection   *Author: Jonas Ørts Hansen*   *Facilitated by the Teacher*

Take already existing ideas the groups have, expanding them even further, both to find opportunities, but also to find flaws in the design, before committing to create a product.

1 hour

10-40 students

9x9 grid, with clear 3x3 borders

Steps

1. Outline the proposition of testing and developing a products or service, that will be put into a real-world context.

2. Ask the students to write down of all the touchpoints (places, opportunities and more) of the end user with your product/service. This could e.g., be:
   - Train stations
   - Supermarket
   - Online
   - …

3. Give the students examples of 'extreme measures'. This could be:
   - Extreme heat, cold
   - Heavy rain or fog
   - Kids or elderly
   - 100 times doubling in users or attendees,
   - No users at all
   - …

4. Have the students solve their problem on these extremes, both to see if they can find improvements, but also if they have an idea of the problems they might face regarding their solution.

4.3.15. In my (Un)biased opinion

Ideate Selection   *Author: Jonas Ørts Hansen*   *Facilitated by the Teacher*

Get inputs to ideate new solutions from people that have no bias towards knowing or solving the challenge. This can help with finding solutions none of the group members would otherwise have thought of.

1 hour

10-40 students
2-15 groups

9x9 grid, with clear
3x3 borders

Steps

1. Pair up project groups with different challenges, so that no pair have the same or similar challenges.
2. Have group 1 present their challenge, as simple as they can. They are not allowed to give any deeper context or any deep insight into the challenge. Just an outline of where the challenge is observed, and who it's a problem to.
3. Group 2 comes up with ideas based solely from what they think they know about the challenge, they are not allowed to search for any information regarding the challenge, only come up with ideas based on their initial unbiased knowledge. All ideas are written down.
4. After 15-20minutes the groups switch ₅o Group 2 presents the challenge, and group 1 come with their unbiased ideas.

Reflection

To help the groups ideate when they have very little context, it can help them to use methods from other activities. This could be activities like ***A.1 Party time, 3.1 Adapt-A-Role***, and so forth.

4.3.16.   Idea Minimisation

Ideate   *Author: Anni Stavnskær Pedersen*   *Facilitated by the Teacher*

The aim is to allow students to practise their competencies in making decisions within a tight timeframe and to recognise the relevance of intuitive decisions in the innovative process.

30-60 mins.

10-40 students
2-15 groups

A virtual whiteboard,
phone and timer.

Steps

1. The teacher creates a timeframe for the selection of ideas by the students. Students must respect the timeframe set by the teacher. The purpose of the timeframe is to 'force' the students into making decisions quickly without reflection or discussion.
2. The students are asked to put all their ideas from the previous idea generation process in a shared document.
3. The teacher instructs the students that within the given timeframe they have to half the number of ideas in the document. The students may have 5 minutes to negotiate how they will select the ideas before moving on.
4. The students are given a set time to select the best ideas to add into the frame. If there are 20 participants, they each are allowed three minutes to select ideas and put them within the smaller frame.
5. The ideas, which are not on the new list of ideas, are discarded. The students now focus on the ideas on the new list.
6. The teacher now instructs the students to reduce the list once again. They are given up to 5 minutes to renegotiate how to pick ideas if they want/need it for the next selection.
7. The students are given a set time to select the best ideas to add into the smaller frame. If there are 20 participants, they are permitted one minute each to select ideas and put them on the new list.
8. The students present their thoughts on the ideas they have chosen for the last remaining list.
9. The following are issues that could be reviewed by the teacher in the conclusion of the activity:

The different ideas become secondary elements of a shared vision. The teacher guides the students

to find a common vision which could incorporate most of the presented ideas. However, as students may have their own point of view, this may prevent them committing to different 'niches' within the common vision.

Reflection

This activity is used after the idea-development stage. It offers a quick method for students to select ideas which they feel most motivated to work on.   The time allocated to each part of the activity depends on the number of students and the timeframe that the teacher has.

4.3.17. Idea A-B-C

Ideate Selection   *Adapted: Anni Stavnskær Pedersen*   *Facilitated by the Teacher*

The aim is to select ideas for development based on their feasibility for implementation.

20-30 min.

10-40 students
5-15 groups

A virtual whiteboard

Steps

1. The students divide their ideas for the solution into the categories A, B or C:
   A. The idea is easy to implement.
   B. An interesting idea which requires more time to be implemented.
   C. A radical idea which would be fantastic to implement but needs additional time to determine whether it is possible.
2. The timescale of the students' current course/module will dictate the basis on which of the three categories the students will prioritize their ideas.
3. The students select the idea which they are most passionate about within the identified category.
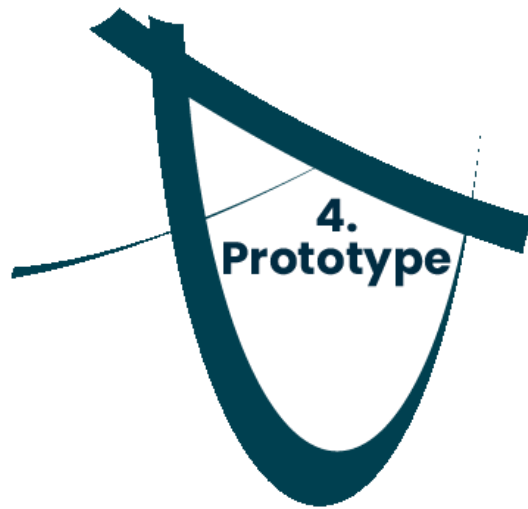
Reflection

Feasibility may be determined by constraints of time, resources, lack of imagination, absence of creativity, lack of materials etc.

Inspiration

Inspired by: Christian Byrge and Søren Hansen - The Creative Platform

4.4. Prototype

When prototyping, the chosen ideas are given form and are substantiated, or 'materialised', so to speak. It is imperative to visualise the ideas for both participants and 'clients' to share, understand, test and validate them. Complexities and opportunities are explored collectively. The knowledge necessary to qualify the prototype is gathered. If possible, the prototype is communicated to and/or tested in the field in order to attain feedback.

 The aim is to conceptualize the ideas and solutions generated in the ideation stage. You are working towards being able to bridge the gap between idea and action. For this to happen, the ideas must be given a manifested visual expression so others can understand and relate to.

4.4.1. Get Real

Prototype   *Author: Anni Stavnskær*   *Facilitated by the Teacher*

The aim is to visualise and create a prototype that is communicable to the client.

1 Day

10-30 students

Whiteboard and creative materials

Steps

1. The students consider the idea/solution from the former phase (ideate) and give it a 'manifest' expression The students work individually with building the prototype.

2. The students choose materials for their model from what they have where they are situated. Paper/pen, building materials etc. A prototype should be created regardless of whether the idea/solution is abstract or material. For example, if the idea is about changing communication patterns in an organization a model should be created.

3. During this process, the students should solve design issues for the prototype. For example, issues such as 'How much? How tall? Who?' etc should be addressed.

4. Students should take pictures with their phones - when they build their individual prototype. This picture should be shared in the virtual whiteboard with a description of the prototype. Alternatively, the students take turns putting on the camera and show and tell about the prototype. Feedback from the class.

5. The students vote which individual prototypes will be presented to the clients or they will realise as an entrepreneur.

Reflection

The clients may not value odd looking pieces of 'prototyping-art'. However, after an explanation from the students, they will value and understand the innovation that the prototype represents.

4.4.2. One MVP builder based on group instructions

Prototype   *Author: Ilse Fraussen /Annelies Schrooten*   *Facilitated by the Teacher*

Build the solution bases on clear instructions by the team.

90 min.

10-40 students
2-15 groups

A virtual whiteboard,
breakout rooms and creative materials

Steps

1. The group sums up the general idea which came out of the ideation phase. What is the idea? What are the main characteristics, features, …?
2. Then the team members discuss their prototyping skills in their project groups. Who has expertise in e.g. 3D or graphic design programs, who is a good cartoonist, …
3. The person with expertise in one of these 'designing' skills shares his screen with the graphic design program. He/She can use different apps/design programs like gamification tools (eg classcraft), creating storyboards (eg pixton), tools for drawing (sketchup, autocad, paint, canva) of even j.ust a whiteboard, and waits for the instructions of the group to start drawing or building.
4. The group gives clear instructions to the designer what he/she has to draw or build, taking into account the characteristics, must-haves and nice-to-haves which came out of the ideation phase. One instruction at a time, every group member has to take turns in giving instructions. If necessary, the oral explanation can be supported by sketches or pictures pasted on the shared whiteboard ('has to look a bit like this…')
5. One instruction by one, the designer is building or conceptualizing the prototype or MVP (Minimum Viable Product).
6. When every group member has added an instruction to the MVP, a second round of instructions can be started.
7. After the MVP or protype is – according to the whole group – finished, the group can start working on the realisation and communication (next element of the digital Atom Model).

Reflection

The activity could be done using online tools such as Padlet, virtual whiteboard. If there are graphic design skills available within the group, a specialised graphic design program can be used (e.g. classcraft, pixton, sketchup, autocad, canva, paint, …).

4.4.3. Build your own MVP

Prototype   *Author: Ilse Fraussen/Annelies Schrooten*   *Facilitated by the Teach*

Build your own & share

90 min.

10-40 students
5-15 groups

A virtual whiteboard and
materials from surroundings

Steps

1. First discuss the final idea that came out of the ideation phase. What was the idea that they selected. What will the prototype roughly have to look like? Draw up together with the whole group a list of must-haves and nice-to- haves. Write or draw these on a virtual whiteboard.
2. Then everyone starts working individually for 20 minutes, imagining what according to them the prototype has to look like. Then they start collecting materials in their surroundings, drawing, crafting or building their ideal 'prototype' or MVP.
3. After 20 minutes everyone returns to the screen and in turn, every team member presents his or her prototype, explaining why they build it like that and what the specific characteristics are and what their function is; how will it work...
4. After everyone presented his or her MVP, the voting starts. Every team member has 5 stars to rate the different MVP's. They can distribute the stars over different MVP's or give one MVP all 5 stars.
5. The MVP with the most stars wins the competition
6. After that, a group discussion is started where every team member can argument what other details should be added to or removed from the final MVP.

Reflection

By first building their own MVP every group member is engaged in the process. The final prototype is the result of honest voting for the best solution and of a joint discussion on what is missing. In this way, a more detailed prototype including the best suggestions from all team members will be the result.

4.5. Realise

After careful evaluation, plans are made for the implementation of the prototype in the field. The guiding principle in this process is matching the prototype to the 'possible'. Steps are designed for the realisation to take place. Questions such as who? where? and how many? are answered. Needless to say, this takes place in a dialogue between the external stakeholders and the participants. Depending on the circumstances, either a full realisation of the prototype can take place, or a detailed blueprint is created.

The aim is to design a plan of how to implement the prototypes. The plan must be realistic and sufficiently detailed for others to put it into practice. The next step is the realisation of the prototype, if possible, within the given frames.

4.5.1. The Elevator Pitch

Realise   *Author: Ilse Fraussen*   *Driven by the Students*

The aim is to persuade the audience to buy, invest or collaborate in your product.

20-30 min.

10-40 students
2-15 groups

A virtual room Teams/Zoom

Steps

1. The students create a pitch that include the answers to these 8 points, which should be covered in one minute:

    a. Who you are and what your role is?
    b. Any relevant background
    c. The problem that you are solving
    d. References
    e. The phase of the challenge
    f. What is the added value for your audience, your customers?
    g. Customize your pitch to the person you are talking to
    h. You conclude your pitch with a specific question.

2. The students pitch their idea/product in a virtual room for the group/students

Additional help on pitching can be found at https://www.presencing.org/resource/tools

Inspiration

4.5.2. The Network Map

Realise   *Author: Anni Stavnskær Pedersen*   *Facilitated by the Teacher*

The aim is to raise students' awareness of their contacts' potential in aiding the creation of a solution.

30-60 min.

5-50 student
2-20 groups

A virtual whiteboard

Steps

1. The teacher asks the students to draw a rough circle to represent a network, it's advised the students make this digitally hence it's easier to help the students to come up with ideas if they can show and tell what they have.
2. With their respective challenges in mind, the students must fill their circle with:
   - Close contacts at the center - close friends & close relatives
   - Good contacts a little further from the center - colleagues, friends/acquaintances & relatives
   - Peripheral contacts at the edge. Facebook and LinkedIn connections or companies that could be relevant to the challenge.
3. The teacher tells the students to review their network of individuals and select three contacts whom they believe may contribute positively to the preparation of their suggested solutions. The students plan how they would establish contact with these individuals and how they would engage them in productive collaboration.
4. The students implement their plans and attempt to get in contact with the chosen individuals and collaborate with them.
5. The students identify which of their contacts they had most success in contacting and how they will engage these individuals during the process of the project work.
6. The students and teacher reflect upon the importance of having a network. The teacher may present some generic information about the value of networking here.

Reflection

This activity can expand the range of knowledge, competencies, materials, etc. from which the students may draw. It helps to identify with which individual students they may collaborate to generate solutions. This activity can be connected to a lesson about the importance of network when working with innovation and entrepreneurship.

4.5.3. Marketing

Realise   *Author: Christian Byrge*   *Facilitated by the Teacher*

The aim is to help students develop skills in producing ideas/prototypes for potential customers by using the 'principles of persuasion'.

5-10 min.

10-40 students
2-15 groups

A virtual room Teams/Zoom

Steps

1. The students pair up with someone who has a sibling the same age as them to complete the activity, get them to write the age of their eldest sibling in the chat, and match them up this way (those students who do not have siblings should pair up with each other).
2. The students should use a prototype from a previous activity.
3. The students must sell this idea/prototype to a relevant customer by using the following principles (of persuasion) and see how they impact on the customer's perceptions of the students' idea/prototype:
   - The reciprocity principle: This principle of persuasion concerns the customer's inclination towards purchasing/using your idea if they feel that they owe you this. A connection is created by giving them a small gift or token. This principle is sometimes employed by restaurants who might give the customer a chocolate or a sweet in anticipation of receiving a tip or gratuity.
   - The scarcity principle: This principle of persuasion concerns the customer's inclination towards purchasing/using your idea if they are told that it is scarce. This principle is frequently used by shopping websites telling customers how many products have been sold in the last hour and how many are left in stock.
   - The authority principle: This principle of persuasion concerns the customer's inclination towards purchasing/using your idea if it has been associated with a recognized expert/company. This principle is often employed by makers of toothpaste and toothbrushes, who might use a dentist (the authority) to emphasize that this specific toothpaste will ensure clean and healthy teeth.
   - The consensus principle: This principle of persuasion concerns the customer's inclination towards purchasing/using your idea if they are made aware of the number of people, who also use the same item. This principle is often employed by Facebook. This website makes people aware of their friends' interests in events that are happening at a specific time.

4. The students are given 10 minutes to complete the activity. If necessary, students may repeat steps 3 and 4.
5. The teacher and the students reflect on the outcome of the activity in a virtual room.

Reflection

This activity is suitable for students trained in creative thinking.

4.5.4. Steppingstones

Realise   *Author: Anni Stavnskær Pedersen*   *Facilitated by the Teacher*

The aim is for students to 'concretise' their suggested solution by converting them into 'steppingstones'.

1 Day

10-40 student
2-15 groups

A virtual room Team/Zoom

Steps

1. The students form their respective project groups and are given a power point file with the slides having a stone as a watermark.
2. The students must create concrete actions in order to complete their suggested solution. Each slide represents a steppingstone on their path: 1 action = 1 slide. The students should write down their names and dates on each slide.
3. The teacher should help the students consider the details of their steppingstones.
4. Each steppingstone should be as specific as possible. The following questions should be considered by the students:
    a. What is it that we need to do and how?
    b. Who will be participating?
    c. When will we activate the elements in the process? What does our timeline look like?
    d. Which contacts will be included? Who will do this and when?
    e. Which resources does our suggested solution require? How do we acquire them?
5. The groups can work inside or outside of the virtual classroom.
6. The students 'build' their steppingstone path for their suggested solutions.
7. The groups meet after 1-2 hours and present their steppingstones to each other in the virtual room.

Reflection

Students will use PP with each slide representing a stone. It is essential that the tasks are concrete and that the students commit themselves to taking responsibility for their actions during the process.   Pictures of real stone can be put on the slides and used in the activity.

4.5.5. Step-In

Realise   *Author: Anne-Merete Iversen,*   *Facilitated by the Teacher*
             Anni Stavnskær Pedersen

The aim is to make a plan for the realization of the prototype using practical creativity and innovative imagination.

1 Day

10-40 students
3-15 groups

A virtual whiteboard and computer

Steps

1. The Project Groups, the students have been working in within the elements, should examine and analyze the feedback from the clients on the prototype before starting this activity. The Groups should make sure that they have all the information needed from the client to create a realistic plan for implementing the prototype.

2. The students study the client's organization/enterprise and think about the following: In which departments, aspects or teams is the prototype to be implemented? What is at stake? Which are their routines? What will it take to ensure a successful realization of the prototype? Students should take notes (phone/computer) on their research.

3. The students now take a 'trip' to the future where the prototype has been realized. In pairs within the project group, the students play the role of interviewer and interviewee and answer the following questions: How does it look? What are the results? What positive changes have taken place? Students should take notes on the responses.

4. The students should make a Power Point. Each slide represents a steppingstone to the realization. The students should pretend to be 'in future' where the prototype is realized.

5. The students should now return to the present and think about the following questions: What will it take to come from the present to the future realization?

6. The students should look at each steppingstone (the slides) and discuss and decide what steps to take to realize the solution thinking about the following questions: What? Where? Who? How many? Students should write the answers on the respective slide.

7. The students get an overview of the slides and create a plan adding an appropriate heading for the client to follow.

8. The students send the plan to the client. They should request an acknowledgement email from the client to ensure that that the plan has been delivered to the correct person.

4.5.6. Pitching Game

Realise   *Author: Curtis R. Carlson,*   *Facilitated by the Teacher*
                     William W. Wilmot

The aim is to strengthen the students' competencies and experience in formulating their suggested solutions for a pitch.

30-60 min.   10-40 students   Whiteboard, PowerPoint
                    5-15 groups   and phone

Steps

1. The teacher asks the students and their groups to create their pitch based on the NABC (Need, Approach, Benefit and Competition) method. The pitch shouldn't last for more than 4 minutes.
2. The students draw (on their phone/computer) up a concrete plan for their pitch.
3. The teacher encourages the students to think about the verbal and nonverbal communication aspects and what is possible, when it is online of the pitch and to take into account the limitation/possibilities of online presentation - their body language, tone, style of language (register) and the room in which they will pitch. If the students want to, they can also film their pitch to explore the unconscious elements of communication in order to determine how these may affect their audience.
4. The students select their approach to the pitch best fits their individual personalities.
5. The students present online their pitch to their group.
6. The group gives feedback to each of the students.
7. The students reflect on the feedback and incorporate ideas to improve their pitch.

Reflection

*NABC - Need, Approach, Benefit and Competition is recommended as it focuses on the solution's value to customers/users. The pitch should include all 4 elements although the students do not need to follow them in any specific order.

- Need – Who needs the product?
- Approach – What is the solution about?
- Benefit – What are the concrete benefits of the solution?
- Competition – Who are the competitors?

This activity allows students to gain experience in offering feedback to fellow students and in

receiving feedback from external collaborators, teachers and fellow students. Students will reflect upon their body language, gestures, expressions, interactions and verbalisations in of the pitch.

For additional help on pitching go to: https://www.presencing.org/resource/tools

4.6. Evaluate

Lastly in the 6 elements of innovation is the evaluation. This evaluation is composed of two parts: an external and internal part. In the external part the idea and the action or action plans are evaluated by the external partners in the project. This is an end point of the students working with solving the challenge.

The aim is that students get feedback on the material or non-material solutions of the challenge. The feedback can both be from the company or organisation that made the challenge, but it can also be feedback from the end-user of the solution. This part of the evaluation depends on who made the challenge that formed the core of the process.

Following this is an internal evaluation with the teachers and the other students. One perspective here could be to make the evaluation look more to the future, making it look forward rather than backwards. In other words, the evaluation could also be a more emergent evaluation.

4.6.1. Feedback and Evaluation from the external partners

Evaluate *Author: Anni Stavnskær Pedersen* *Facilitated by the Teacher*

The aim is for students to receive feedback on their solutions from external partners.

30-60 min.

5-50 students
1-20 groups

A virtual room, Teams/Zoom

Steps

1. The teacher organizes a virtual meeting with the external partners to receive feedback on their solutions. Alternatively, the group could make a video and send this to the partners.
2. The teacher and the group plan the content of the meeting by deciding on the format of the feedback:
   - A feedback checklist could be created for the external partners to complete.
   - Columns of 'pros and cons' could be created to note the feedback.
3. The external partners give their feedback to the group stating pros and cons for every solution the group created:
   - The members of the evaluation panel may choose to give spontaneous feedback
   - or the teacher may decide on the types of feedback and evaluation criteria which the external collaborators may use regarding the value the solution creates.
4. The external partners decide if they are going to implement the group's ideas. They should give reasons for their decisions.
5. The group discusses the feedback and highlights areas of strength and weakness in their processes. They should examine the possibility of modifying and resubmitting their ideas to the external partners.

Reflection

It is important that there is a high level of planning in this activity to ensure that the students receive as much constructive feedback from the external partners as possible.

4.6.2. Feedback Panel

Evaluate   *Author: Anni Stavnskær Pedersen*   *Facilitated by the Teacher*

The aim is for students to implement feedback from external collaborators to their solutions.

20-30 min.

5-45 students
5-15 groups

A virtual room, Teams/Zoom

Steps

1. The teacher prepares the following for the task:
   - An evaluation panel of external collaborators is created.
   - The teacher outlines feedback criteria from the panel.
   - Students are formed into their project groups that they formed around the challenge.
2. Each group presents their suggested solutions to the evaluation panel.
3. The evaluation panel gives feedback on the advantages and disadvantages of the solution. The following questions could also be used for feedback for the solution:
   - Is it a radical innovation?
   - Does it contribute to the notion of value creation?
   - Does it contribute new and creative solutions to an existing product?
   - Is it as innovative as other products available?
4. The groups ask the panel questions about the feedback and the panel states whether they will use the group's solution or not.
5. The groups reflect on the feedback highlighting areas for improvement.
6. The groups discuss the action to solve any disadvantages or/and discuss the next steps for their idea to implement it.

Reflection

The external panel should be comprised of members that have knowledge of the 'solution'. The feedback criteria could be widened to include considerations relating to time and the resources needed for the solution to be produced.

4.6.3. Self-Assessment

Evaluate   *Adapted: Anni Stavnskær Pedersen*   *Facilitated by the Teacher*

The aim is to encourage the students to develop their ability for active reflection in the learning process.

3-4 hours

10-40 students
5-15 groups

A virtual room, Teams/Zoom

Steps

1. The teacher and/or the students create evaluation criteria and a digital checklist The teacher could use the evaluation criteria used by The Danish Foundation for Entrepreneurship.
2. The students are organized into their project groups. Group A and Group B. Each group prepares presentations for their challenges. Group A presents their idea to Group B who evaluates the ideas in their presentation. Group B gives constructive verbal feedback completing the checklist and giving a grade for the project.
3. The roles are reversed with Group B presenting and Group A evaluating.
4. The Groups then gather all the feedback and discuss it to develop strategies to implement suggestions for their projects.
5. The activity can be repeated with new pairs of groups if necessary or if there is many groups be done in break-out rooms.

4.6.4. Get-A-Grip

Evaluate   *Author: Ann-Merete Iversen*   *Facilitated by the Teacher*

The aim is to make a visual exploration of the dynamics of the challenge.

3-4 hours

10-40 students
2-15 groups

A virtual whiteboard

Steps

1. Students write the challenge in the middle of the shared whiteboard or padlet.
2. Students take turns to write/draw questions about the challenge e.g.
   - What puzzles you?
   - What questions 'spring' to mind? All students should contribute to the task.
3. Students write down all the questions as they appear on the virtual whiteboard. They should identify the following from the questions:
   - What questions are significant?
   - Are there patterns emerging?
   - Is there any information missing?
4. Students decide on 3-8 questions that they agree on. These questions can be open ended or simple, factual or questions of a more 'philosophical' nature.
5. Students research the client's webpage to ensure that the questions cannot be answered here.
6. Students forward the questions to the client for answers to help them proceed in their challenge.

Reflection

During this activity, the students can see the process that results in complex questions emerging.

4.6.5. One Minute Paper

Evaluate   *Adapted: Calum Crosbie*   *Facilitated by the Teacher*

The aim is to evaluate the students' solutions for the challenge

30 min.   10-40 student   A virtual whiteboard

Steps

1. Students should write a one-minute paper evaluating the project group's solution to the challenge. Possible prompts for the activity could be:
   - Did the solution meet the needs of the client?
   - What parts of the solution do you think could have been improved?
2. The students write down at least 4 evaluative points about the solution.
3. The teacher creates 2 columns on the shared whiteboard – 'Strengths' and 'Weaknesses'. The students reflect on their points and write them under the appropriate headings.
4. The project group then discusses all the points on the whiteboard, reflects on them and suggests ways that future projects could be improved.

Reflection

The evaluation could centre on the solution that was created by the group or on resources and materials used by the group for the solution. The activity shows the importance of the reflective process in learning.

Inspiration

Inspired by: Cross and Angelo (1988)

https://oncourseworkshop.com/self-awareness/one-minute-paper/

4.6.6. Evaluate the opposition

Evaluate   *Adapted: Calum Crosbie*   *Facilitated by the Teacher*

When different teams or individual students have been working on a challenge, the results are presented to and discussed with the different teams/students. Help everyone become a better analyst by fostering discussion and sharing opinions.

90 min.

10-40 students
2-15 groups

A virtual whiteboard and breakout room

Steps

1. Project group 1 first presents their solution in a shared virtual room to the other participants, followed by project group 3, 4,.
2. After all the teams have presented their work, open a breakout room per project group where the result of their work is shared (can be a power point presentation, a design of their prototype, a moodboard, …)
3. Divide the different groups to the different breakout rooms.
4. Provide each group with the work from another group or participant and have them analyze and discuss the work of the other groups. They add their critical remarks or findings on a virtual whiteboard in each of the breakout rooms.
5. After each group has evaluated the work of all the other groups and have added their remarks, start a group discussion on the remarks given. Repeat this process for every group. The original group which has been working on the solution can give feedback on the remarks. In that way, the group is given a chance to counter the remarks or to ameliorate the initial work.
6. After this, the groups can be given some extra team to adapt their original solution.

Reflection

Using this activity, students learn to analyse and appreciate the work of others. By discussing all given remarks with the whole group, the initial work can be validated and even ameliorated.

Inspiration

Inspired by: https://sessionlab.com

4.6.7. Self-evaluation

Evaluate   *Adapted: Daniel Bloch Nielsen*   *Facilitated by the Teacher*

The aim with self-evaluation is to give the teacher a greater understanding of the student's level, both on a cognitive and non-cognitive level regarding entrepreneurship. Getting students to self-evaluate also makes them reflect on the process and is therefore a learning process in itself.

90 min.

5-50 students

A virtual whiteboard and breakout room

Steps

1. The link to the questionnaire will be send out to all students both at the beginning and the end of the course. This way, we (and the students) will be able to track their progress in both cognitive and non-cognitive skills in regard to entrepreneurship.
2. The teacher introduces the students to the self-assesment questionnaires and give time during the lesson to the students to fill it out: https://forms.office.com/Pages/ResponsePage.aspx?id=l4kz1kohkk-6dQOX8QqEzCwwec24nPZDoDOviqFzIKVUQVBIREJTWDNDWDNQTlpXU1NFN0JLSTZKRy4u
3. Filling out the self-assessment questionnaires and using the tool at both at the beginning and at the end of the course, gives the teacher a digital tool to collect the answers. The tool auto-generates a report, that can be used to quickly get a sense of the students learning outcome and evaluation.
4. This report could be beneficial for the teacher in regard to improve the teaching when knowing the individual entrepreneurial level of the students.
5. The report can also be used by the teacher to start a dialogue and meta-communicate with the students about their entrepreneurial learning journey.
6. This report can also give data to the educational institution of the entrepreneurial learning of the students in the different courses and for researcher within entrepreneurship.

Reflection

The fact that the lesson or course was digital, does not change the overall assessment of learning of cognitive or non-cognitive entrepreneurial skills. However, we've also added a few more questions, to assess if the digital learning had a positive or negative impact.

Inspiration

The self-assessment questionnaire contains questions inspired by the self-evaluation works of Moberg, S.K. (2015) and Wick et al. (2016) in the fields of Innovation and Entrepreneurship. The questions have been modified to fit into a digital context and a digital tool (in this case, Microsoft Forms).

5. Conclusions

The collaborators were in a unique situation when they developed the ForEMLink project, as they had to rapidly adapt to the impact of Covid on their working practices. This resulted in significant changes to the methods of working collaboratively to meet the aims of the project. This provided an invaluable experience for all the collaborators who were '*transported into the future*' and were uniquely positioned to experience future learning and collaboration.

The Team was able to develop, collaborate and showcase their use of digital technologies in producing new and innovative approaches to learning and entrepreneurship, which gave them an insight into the learner's perspective when working online. Therefore, the Team developed Activities that could be delivered online whilst maintaining collaboration when working remotely.

The Digital platform has created an invaluable access point for local businesses to collaborate with learners from local education institutions. This will allow businesses to engage with local expertise in developing local solutions to local problems and thereby stimulating the local economy.

Learners will develop their personal and intellectual abilities as they progress through the Methodology of the D-EMIND project. They will gain an invaluable opportunity to be involved in stimulating situations which will present them with new and very real Challenges. For example, the impact of climate change and the adaptations required by business on their innovative thinking and entrepreneurship.

The structure of the Digital Atom Model in the the D-EMIND project, the Spheres around it and the associated Activities, allows the learners to progress through a pathway that will enable them to develop the necessary entrepreneurial skills to be successful in meeting the Challenges from different businesses and public institutions. Although there to some degree is a linear approach to the element Atom Activities from (1-6), there is a high degree of flexibility that will allow the learners to choose the correct path for their entrepreneurial journey and to take ownership of the Challenges.

The unique development history of the D-EMIND project provides a platform that brings businesses and public institutions and learners together globally and without travelling and, giving members of different communities a stake in solving some of the pressing problems that we all face in a very uncertain and changing world.

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1. Explore

2. Analyse

3. Ideate

4. Prototype

5. Realise

6. Evaluate

THE CHALLENGE