

# Becoming a Global Engineer

## Intellectual Output 4



Becoming A Digital Global Engineer



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# Introduction

Engineering students have a huge potential to become entrepreneurs and build a startup because they are usually oriented towards developing a product, solving a problem, improving various processes and making something that might have seemed impossible actually tangible. However, as studies and practice shows, students often lack soft skills (e.g. leadership, communication, interpersonal skills, teamwork, etc.). Also, engineering students (esp. those who are considered to be Gen Z) more and more often do freelance work or establish entrepreneurial start-ups, which involves use of various ICTs and a lot of online communication. On many occasions, such communication is intercultural. Intercultural communication often causes various challenges, esp. when it does not happen face-to-face. Freelancers, as well as entrepreneurs, are expected to be good communicators and negotiators; they should have good interpersonal skills and speak foreign languages. They need to be open-minded, innovative, creative, and not afraid to take risks. They are expected to be great team players, but also be able to work autonomously. There are many pathways that lead to developing these traits. One of them is learning based on the Framework of Global Competences, which can be extremely useful for engineering students while studying subjects related to the major and developing core competencies, including speaking foreign languages.

International cooperation in this project will ensure a natural setting in which we can develop and test these with the help of students with different backgrounds.

**The goal** of the material: to develop, test and disseminate language-neutral learning activities for global competence (GC) and Entrepreneurial competence (EC) skills.

The material is based on a design-thinking approach methodology that combines the problem-solving roots of design with deep empathy for the user.

**Design thinking**, developed by David Kelly, a highly esteemed Stanford professor, originally came as a method of teaching engineers how to deal with problems in a more creative way. In order to solve a problem, one should adopt a designer's mindset and approach the issue from the user's perspective. In other words, "Design thinking can be seen as 'out-of-the-box' thinking since it encourages you to explore alternatives by creating different, and often innovative, solutions that you might not have thought about" (Misfud, 2022). The Design thinking process usually consists of five interdependent stages: empathize, define, ideate, prototype and test. This material is designed according to the stages of the methodology and the students are expected to gain a certain set of skills and competences in each stage, i.e. each unit.

The first step, Empathise, means getting to know the audience, the people one is working with, realising their needs and wishes. In the Define stage, one should analyse and structure the gathered information, and then define the problem/issue. At this point, the problem becomes clearer and it is possible to start

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looking for solutions. Once the information/data is collected, it is the time for brainstorming or the Ideate step. Then, in the Prototype stage, teamwork is essential and students are exploring a number of ideas, as well as potentially good approaches to the problem. The final step is Testing, where students identify a potential solution to the problem. In this e-book, the five stages of the Design thinking methodology are incorporated into three units: Empathise and Define (1), Ideate (2), Prototype and Test (3).

Possible to add a video or few for an introduction as well (WILL BE ADDED)

This material is designed for a teacher to choose the amount of material according to their needs, time limits, and expected results. Thus, the whole material or parts of it can be flexibly used, reused, and adapted based on the affordances one might have. The e-book consists of three units and activities within each unit: core (in blue) and optional. If all are used, the material could be delivered throughout a semester. If used in parts, it could be delivered in several weeks, classes, or even during a class. To support the teacher and their students' learning process, the e-book comes with a template slideset that can be modified according to one's needs.



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**UNIT**

**1**





# Description

# 1

## Empathise and Define

**Learning outcomes.** GC and EC skills to be acquired:

|                    |               |                 |
|--------------------|---------------|-----------------|
| Critical Thinking  | Social skills | Open Mindedness |
| Empathy Leadership | Creativity    | Collaboration   |

In the Empathise & Define stage, students firstly get to know their team and afterwards, they identify the target audience, realising their needs and wishes. They analyse and structure the collected information, and define the challenge. At this stage, the problem becomes clearer so that solutions can be found in later stages.

## Activities & Preparation

The activities covered in the unit are as follows. **Core activities are highlighted in blue** and other activities are optional. Approximate timings are indicated in brackets.

### **ACTIVITY 1: Ice-breaker (20 minutes)**

Preparation: Choose a suitable option and prepare a room or an online platform accordingly.

### **ACTIVITY 2: "Good teamwork" (20 minutes)**

Preparation: Provide flip charts, pens and a video about "What is good teamwork" in TL.

### **ACTIVITY 3: Team Allocation & Collaboration Tools (45 minutes)**

Preparation: If students are assigned to separate teams by the teacher, this needs to be done prior to the session.

### **ACTIVITY 4: Personal values and strengths (30 minutes)**

Preparation: Research and adapt the necessary materials in the TL.

### **ACTIVITY 5: Concept of "challenge" (30 minutes)**

Preparation: Might need paper or sticky notes and pens / a shared online whiteboard where everyone can add their ideas.

### **ACTIVITY 6: What "challenge"? (45 minutes)**

Preparation: Prepare material about sustainable development goals in TL. If working with Option 1, the teacher is the one who chooses the challenge that students are going to work on in the project.

### **ACTIVITY 7: Defining users (30 minutes)**

Preparation: If choosing Option 1, the teacher chooses the target group.

### **ACTIVITY 8: Question types (15 minutes)**

Preparation: Teacher prepares a set of questions in the TL to be matched with different question types.

### **ACTIVITY 9: Interview questions (30 minutes)**

Preparation: Teacher finds a video of an interview and a research paper about qualitative research in TL.

### **ACTIVITY 10: Designing questions (45 minutes)**

Preparation: Might need paper or sticky notes and pens / a shared online whiteboard where everyone can add their ideas.

### **ACTIVITY 11: Conducting interviews (60 minutes)**

Preparation: If using Option 3, collaboration with a partner university needs to be established beforehand.

### **ACTIVITY 12: Observation (60 minutes)**

Preparation: If using Option 2, the teacher finds videos of different communities within the chosen challenge.

### **ACTIVITY 13: Observation analysis (30 minutes)**

Preparation: Might need paper or sticky notes and pens / a shared online whiteboard where everyone can add their ideas.



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# Activities

# 1

## ACTIVITY 1: Ice Breaker

### Face-to-face mode

#### Option 1

##### Throw the ball - names

Students and the teacher form a circle. The teacher gives one person a soft ball and asks them to throw it to someone else in the circle. The student who catches it says their name and throws the ball to another person, until everyone has had their turn (if needed, twice). As a progression, the person throwing the ball calls the name of the person who is supposed to catch the ball.

#### Option 2

##### When's your birthday?

Students are asked to find out everyone's birthdays and line up in the room accordingly (from January to December). Participants need to talk to as many people as possible, learn their names, talk to and negotiate with others.

#### Option 3

##### Where in the world?

Give students two minutes to think of three clues that describe, but do not give away, either the country they are from (if different from the one they are studying in) or their favorite foreign place they have visited or dream of visiting.

When ready, each person gives their name and their three clues, and the rest of the group guesses where in the world they are describing. The teacher gives each person a minute or two to explain what they like best about their favourite place in the world. The teacher should start with themselves so that students can follow their example.

### Example:

(Option 3)

*Hi, my name is Deb. One of my favorite places in the world is tropical, has a beautiful body of water you can climb, and it is near a popular cruise port.*

After guessing is finished:

*One of my favorite places in the world is Dunn's River Falls near Ocho Rios, Jamaica. We stopped there on a Caribbean cruise and had the marvelous opportunity of climbing the falls. You start at sea level and can climb 600 feet gradually up the river, swimming in pools, standing under small falls, sliding down smooth rocks. It's a beautiful and fantastic experience.*

### Distance learning mode

#### Option 1

##### Throw the ball - names

While using an online conferencing tool, the teacher says their name out loud and, using gestures, throws an imaginary ball to another person and says 'Hello [Name]' to the next player. Student pretends to catch the ball, repeats their name and throws to the next person. The game continues until everyone's familiar with each other's names..

#### Option 2

##### When's your birthday?

Replicate the face-to-face version using a virtual reality platform like 'gather.town'.

#### Option 3

##### Where in the world?

Replicate the face-to-face version using your online teaching platform. Additionally, online tools like flashcard-makers or maps with pins could be used to reveal the answers.

## Tips for the teacher:

- These activities are meant as a warm-up and help to break the ice among the students.
- For these kinds of ice-breakers, the teacher should always start with an example so that students understand what is expected from them.
- The “Throw the ball activity” can be done on any video communication platform like Zoom, MS Teams etc. by throwing an ‘invisible ball’ while keeping the gesture of throwing and catching. Everyone’s (preferred) name has to be displayed (including a pronunciation tip if necessary [e.g. Kasia (Kah-shah)] to encourage everyone to be inclusive in their choice of the next person speaking).

## ACTIVITY 2: “Good” teamwork

### Face to face mode

**a)** Split the group into sub-groups and ask students to brainstorm, generate and capture their ideas on what are the principles of being a ‘good team member.’

When finished, all sub-groups present their findings.

**b)** Teacher presents a definition of effective teamwork / video on successful collaboration in the target language. Students comment and compare with their findings from the group exercise.

### Example:

Different groups come up with different results. Some might focus on formalities like being on time or meeting regularly. Others might prioritise soft skills such as reliability or humour. The teacher can then introduce additional aspects in Step b.

## Tips for the teacher about the integration of pedagogy, technology, and content:

- A (Youtube) video defining good team work could be used as inspiration for the teacher or shown to the class during Step b.
- To learn more about each other’s expectations, cultural differences, etc., students can discuss/share their ideas on what good team work is for them personally and how it could be understood in their culture or profession
- There is no “right or wrong” in this activity. Teachers can stress that good teamwork has a different meaning to different people and groups.

## ACTIVITY 3: Team allocation and collaboration tools



### Face to face mode

#### Option 1

Students are grouped by the teacher to ensure the interdisciplinary diversity (if applicable).

#### Option 2

Random allocation. Depending on the number of students, students count up to 3 or 4. Teacher asks the same numbers to form groups - these are the future teams.

#### Option 3

Students form groups themselves.

### Distance learning mode

#### Option 1

Equivalent of Option 1 Face-to-face.

#### Option 2

Equivalent of Option 2 Face-to-face through a random allocation, e.g. via tools embedded in the conferencing platforms (e.g. assign students to breakout rooms). Alternatively, the teacher can use one of the many automated team generators that are available free of charge online (here, the only input needed is a list of students' names).

#### Option 3

Equivalent of Option 3 in the face-to-face mode.

### Continued activity (for all options):

To introduce the topic of collaboration tools that students will be using on the project, the teacher can start with a brainstorm to activate students' existing knowledge (white board): What online collaboration tools are you familiar with?

#### Individually:

Teacher provides an adapted text in the target language. Students have to define the pros and cons for every tool. (suited for asynchronous learning)

#### Group work:

Students in their teams define which tool they are going to use and present it in plenum by justifying their choice.

### Example:

After forming the groups and brainstorming collaboration tools, students are presented with a text or video about the different collaboration tools in the TL. This will help them make an informed decision for a tool.

### Tips for the teacher:

If choosing option 3 for the team allocation and letting students form groups themselves, the consideration would be that they are unlikely to be very inclusive in their team members' choice and be naturally drawn to those who are 'more like them.' More diversity in the teams would foster inclusion, innovation and communication skills.

Even if the teaching is conducted in person, online collaboration tools are still useful, as they allow students to work together outside the classroom more easily and keep track of their activities.

The materials used as input for the reading/listening comprehension about the online collaboration tools need to be updated regularly since the technology is changing rapidly and this needs to be reflected.



## ACTIVITY 4: Personal values and strengths

In this activity, students are encouraged to reflect on the strengths (based on their personal values) they are bringing into their team.

### Option 1

#### a) Individually:

Each student is given a list of values in the TL (all or a selection of at least 20 values, e.g. from the list below). The teacher checks for understanding by going through the list and asking for synonyms if necessary.

The teacher asks the students to choose the 10 values they are most drawn to, then to narrow it down to five, then to three. Inspirations can be found here: <https://leadthroughstrengths.com/values/> or the list below can be adapted accordingly.

|                 |                |              |                 |               |
|-----------------|----------------|--------------|-----------------|---------------|
| Accomplishment  | Creativity     | Growth       | Optimism        | Thankfulness  |
| Accuracy        | Curiosity      | Happiness    | Orderliness     | Tolerance     |
| Acknowledgement | Determination  | Harmony      | Passion         | Tradition     |
| Adventure       | Directness     | Health       | Patience        | Trust         |
| Authenticity    | Discovery      | Helpfulness  | Peace           | Understanding |
| Balance         | Ease           | Honesty      | Presence        | Unity         |
| Beauty          | Effortlessness | Honour       | Productivity    | Vitality      |
| Boldness        | Empowerment    | Humour       | Recognition     | Wisdom        |
| Calm            | Enthusiasm     | Idealism     | Respect         |               |
| Challenge       | Environment    | Independence | Resourcefulness |               |
| Collaboration   | Excellence     | Innovation   | Safety          |               |
| Community       | Fairness       | Integrity    | Self-Esteem     |               |
| Compassion      | Flexibility    | Intuition    | Service         |               |
| Comradeship     | Focus          | Joy          | Simplicity      |               |
| Confidence      | Forgiveness    | Kindness     | Spaciousness    |               |
| Connectedness   | Freedom        | Learning     | Spirituality    |               |
| Contentment     | Friendship     | Listening    | Spontaneity     |               |
| Contribution    | Fun            | Love         | Stability       |               |
| Cooperation     | Generosity     | Loyalty      | Strength        |               |
| Courage         | Gentleness     | Optimism     | Tact            |               |

#### a) In groups:

The students work in their designated group - they are asked to talk about their chosen values (only three) and what strength they bring into their team as a result. They should use specific preferences and behaviours to illustrate their strengths:

*"My most important values are X, Y and Z and when working in a team, it's typical of me to/I tend to... ."*

The students will get a better idea of who they are as individuals and a team. Then, the students write a list of 'five useful behaviours' for their team and they record their findings to be kept as a point of reference for the entire project.

**Tip:** Starting with the dos, not don'ts, e.g.: Be on time for the weekly meeting. (not: Don't be late. )

### Option 2

The students complete the values worksheet prior to the session.

### Example:

Student A, after looking up and understanding all the words on the list, chooses authenticity, courage, creativity, fun, helpfulness, honesty, integrity, passion, tolerance, and respect as values they feel most attached to. After some consideration, they narrow this down to creativity, fun, helpfulness, passion and respect. Finally, they choose creativity, helpfulness and respect as their core values.

The students explain their choice to their teammates (using the structure suggested) and listen to the other members' explanations. Based on that, the team will come up with 5 useful behaviours. As most of them mentioned respect as a value, one useful behaviour could be: "Be respectful to all your team members, even if you don't agree with their suggestions."

## Tips for the teacher:

- The list of values can be found online and in different languages (by searching for „free coaching tools: values list“ in the target language).
- Alternatively, a selection of values can be translated into the TL (e.g. by using automated translation tools available online or asking students to contribute with parts of the translation).

## ACTIVITY 5: Concept of “challenge”

**a)** The teacher asks students to find synonyms to the word ‘challenge’ in the target language and captures their answer on a whiteboard.

**b)** Students are invited to think of challenges in different perspectives in small groups considering:

1. time (daily/weekly/ ...)
2. scale (individual/family/work/communities/world)
3. life stages (toddler/child/young adult)

**c)** Optional reflections for the students in pairs:

How do you define a challenge? Can you give an example of a challenge you’ve overcome? How did you address it? How did it change you as an individual?

**d)** In pairs, students write down a definition of ‘challenge’ and present it to the rest of the class. Students compare their definitions and discuss similarities and differences.

## Example:

After finding synonyms for the word ‘challenge’ in Step a), students find examples for challenges from different perspectives, such as the following:

1. Time: *Getting up on time, sticking to deadlines, ...*
2. Scale: *Paying the bills, providing affordable housing, fighting loneliness, ...*
3. Life stages: *Walking to school alone, cooking a balanced meal, writing an attractive CV, ...*

In Step c), students come up with personal challenges that they have overcome, such as a successful application to a university, the first trip abroad without family, etc.

## Tips for the teacher:

- While teachers should guide students in Steps a), and b) and d), they should step back and let students discuss amongst themselves in Step c), as the examples of their own challenges are likely to be of a very personal nature.
- The exercise can also be implemented in a distance mode. Group work could be organised in breakout rooms or chosen messaging chats. To collect students’ inputs and personal stories that they might not want to share publicly, the teacher can use an anonymised polling tool (e.g. survey platforms, such as Google Forms or Survey Monkey, and polling tools, such as Mentimeter or Slido).

## ACTIVITY 6: What “challenge”?

### Option 1

The problem to be solved in the Design thinking process is given by the teacher. Since the focus is on developing students’ global competences, students might be given one of the sustainable development goals (also available in different languages).

Source: <https://sdgs.un.org/goals>

Students brainstorm the challenge, then each team is allocated a sub-topic of that challenge (in the form of a text or video on that topic) to explore before reporting to the rest of the class to put all the knowledge together (jigsaw exercise).

Resources can be provided by the teacher or left to the students to identify.

### Option 2

Students have a discussion on different goals (e.g. taken from sustainable goals) and select the one closest to their major or their general interests.

Students have to report on the decision process they used (brainstorming, shortlisting, convincing/arguing)

### Option 3

Students find an area they would like to explore further in order to come up with a solution in the next stage of the process. In groups, students identify and choose one of the most relevant environmental/societal challenges and present their findings using a collaboration tool of their choice. To make their presentations more impactful and visually pleasing, they can use online platforms that contain ready-made, editable templates (e.g. Canva and Visme).

## Example:

Example challenge: Responsible Consumption and Production (Sustainable Development Goal 12) in the food sector.

The following subtopics could be identified and examined by different groups:

*At production level* (e.g. produce short of standards, harvesting made impossible by weather, overproduction...)

*At distribution level* (e.g. transport, export, conservation, best before date, lack of demand...)

*At consumer level* (e.g. over buying, products going off, leftovers, high carbon footprint...)

*At societal level* (e.g. lack of opportunity to redistribute food, consumerism, lack of education/awareness...)

## Tips for the teacher:

- If time allows, letting students decide themselves on a challenge they would like to tackle is the preferred option.
- Making their own choice increases students’ intrinsic motivation.
- The teachers should encourage students to choose and discuss meaningful and personally relevant topics and real-life issues in their (future) professional area.



## ACTIVITY 7: Defining users



### Option 1

The teacher chooses the target group within the challenge, considering practicability (e.g. whether students could easily liaise with this group, whether the target group is of interest to the students, etc.).

### Option 2

Students define their target group. They should think about how they will access their target group (e.g. questionnaires, interviews, field observation, etc.), and how practical it will be if done online. Students share their thoughts and results with the **class**.

### Example:

The topic "Responsible consumption and production in the food sector" is narrowed down to "consumer level," e.g. food shopping in the supermarket.

The following target groups could be defined: *supermarket customers, retail assistants, supermarket managers and directors.*

### Tips for the teacher:

Students should be encouraged to not only focus on their own perspective, but also consider target groups that are not closely related to their own, i.e. building awareness and stepping into other people's (professional or not) shoes and empathising with their experiences is very important.

## ACTIVITY 8: Question types

Mix and match. The teacher provides a set of questions in the target language, students match them with a definition (open question, closed question, leading question, rhetorical question ...).

### Reflection:

Which questions are the best research questions? Why? (Provide a questionnaire in the TL for students to compare with their speculation).

### Example:

Open-ended questions: *Tell me about your food shopping habits. What do you consider when buying food?*

Closed-ended questions: *Do you care about your personal carbon footprint?*

Rating questions: *How would you rate the sustainability goals defined by the supermarket?*

Multiple choice questions: *Out of these three food items, which one would you most likely buy?*

Questions to collect data (personal information, habits, measurables), feelings (i.e satisfaction), preferences/wishes (prospects, future demands).



## Tips for the teacher:

This topic is a good opportunity to integrate grammar revision on different types of questions in the TL (word order, question words, direct/indirect questions etc.).

### ACTIVITY 9: Interview questions

**a)** Watch or read an interview (e.g. done by a journalist) and critically assess it asking:

What kind of questions are asked (examples)?  
What are the most relevant questions for qualitative research?

**b)**

Read a paper (provided by the teacher) about interview questions or apply conclusions in the next activity.

**c)**

Students or the teacher find empirical studies that use surveys (i.e. interviews or questionnaires) as one of the data sources and inspect what questions were asked and how (e.g. syntax, grammar, lexis, hedging, etc.).

### Example:

Students read/watch an interview with an expert about the idea of carbon labeling of food in supermarkets and identify/analyse the questions asked.

## Tips for the teacher:

- If there is time, the students can come up with a list of their own questions and simulate an interview via different media (e.g. over the phone, via conferencing tools, messaging/video chats, face-to-face).
- Students can discuss asking uncomfortable questions (e.g. questions that are inappropriate in their cultures or professions, such as 'How much do you earn?', 'What is your relationship with your boss?', etc.).

### ACTIVITY 10: Designing questions

In teams, the students design a set of questions in the TL (and the local language) relevant for their challenge and target group.

### Example:

The students decide to develop questions for supermarket customers about their shopping habits, with a focus on responsible consumption, e.g.:

*How often do you go food shopping?*

*Which factors do you consider when choosing a product?*

*On a scale from 1 (not important at all) to 7 (very important), how would you rate the following aspects?*

## Tips for the teacher:

- It's worth ensuring that feedback is provided to the students before they use the questions (check for language accuracy but mainly for appropriateness, i.e. choice of language but also number of questions, clarity etc.).
- Students can be working on the questions collaboratively (e.g. in a shared document).

## ACTIVITY 11: Conducting interviews

### Option 1

Outside the classroom (interviewing real people, preferably in the TL).

### Option 2

In the classroom (interviewing each other using 'personas' created by the teacher).

### Option 3

Establish a collaboration/exchange with a different university for the students to interview each other.

## Example:

In groups, students ask shoppers for an interview "in the field" (i.e. in front of a supermarket in the example case) or they ask people they personally know about their shopping habits.

## Tips for the teacher:

- Authentic interviews in the target languages are preferred over 'fake interviews'. However, finding people that can be interviewed in the TL might only be feasible in a very international environment. An online collaboration with foreign universities can offer a good alternative.
- If conducting real interviews is not possible, students can share the roles, e.g. one student (or a group of students) might be the interviewers who have to come up with the questions, and another student (or a group of students) read reviews of a certain shop online, trying to understand customers' habits, preferences, problems, etc. and answering the interviewers questions based on that.

## ACTIVITY 12: Observation

### Option 1

Outside the classroom: Take observation notes while watching users in authentic scenarios.

### Option 2

In the classroom: Watch videos of users in authentic scenarios and take observation notes.

## Example:

In small groups, students go on a "field trip" to a supermarket to make observations about the shopping behaviour of people. For example, they could stand near the vegetables section and count how many people put local/organic/imported/cheap/expensive tomatoes in their baskets over a certain time period. Instead or additionally, students can also check and analyse friends' or flatmates' shopping, by asking them for permission of data collection when they come back from the supermarket.

## Tips for the teacher:

- As some observation practices might appear intrusive to people, it is important to identify activities that students feel comfortable with.
- Teachers can also introduce observation as a research method (e.g. talk about structured observations, reflection of one's experience while observing, (non)participant observation and its impact on the results etc.).

## ACTIVITY 13: Observation analysis

The students write up a report/presentation/visual representation (e.g. by using online presentation platforms like genial.ly) including description, statistics, etc. (linking it to critical thinking/analytical skills).

### Example:

Using their findings from observations about shopping habits, the students develop graphs, e.g. showing the percentage of people buying organic tomatoes compared to conventional tomatoes. Students could also prepare infographics to represent their (research) interest, questions, observations, findings, suggestions or other relevant details (e.g. by using online templates available on various platforms, such as Visme or Canva).

## Tips for the teacher:

- The presentation of the observation findings could be combined with an analysis of the findings and/or quotes gathered through the interviews conducted before.
- Before the presentations, students should be briefed on how to present data, numbers, graphs, etc. in the TL.

## SELF-EVALUATION QUESTIONS

*1. What have you learnt about teamwork?*

*2. What makes you a "good team player"?*

*3. How did this unit inform your self-awareness about your personal values and strengths?*

**UNIT**

**2**



# Description

# 2

## Ideate

**Learning outcomes.** GC and EC skills to be acquired:

|                   |               |                                     |                 |
|-------------------|---------------|-------------------------------------|-----------------|
| Active listening  | Creativity    | Constructive feedback and criticism |                 |
| Critical thinking | Social skills | Collaboration                       | Open mindedness |

In the Ideate stage, students are to conduct small-scale projects for a mock client and brainstorm ideas for possible solutions. After collectively generating several ideas, they filter and reduce them to identify the most innovative and practical solutions.

## Activities & Preparation

The activities covered in the unit are as follows. **Core activities are highlighted in blue** and other activities are optional. Approximate timings are indicated in brackets.

### **ACTIVITY 1: Warm up / Creativity training (40 minutes)**

Two options for warm-up activities related to brainstorming and creativity. The paperclip method does not require any preparation, the brainstorming card activity could require some card preparation for the teacher.

### **ACTIVITY 2: Teamwork through ideational techniques (30 to 60 minutes)**

Two options for teamwork-related activities focusing on workplace situations and discussions of behavioral dimensions affecting teamwork. Preparatory materials include the selection of a case study and/or preparation of a link directing students to the cultural dimensions.

### **ACTIVITY 3: Brainstorming clients' needs / identifying problems (60 minutes)**

Students should try to identify a mock client's needs through a brainstorming process.

### **ACTIVITY 4: Collecting and refining ideas (60 minutes)**

Students should work on collecting and refining their ideas using an affinity diagram.

### **ACTIVITY 5: Choosing the best idea (30 to 60 minutes)**

Students should select the best solution among the gathered ideas according to their mock client's criteria.





# Activities

# 2

## ACTIVITY 1: Warm up / creativity training

The following are warm-up exercises which could be done before the other Ideation phase tasks are started. There is no special preparation for this part, as it is more of a fun and creativity-boosting activity. The goal is to push the limits of students' creativity so that they get ready for the upcoming tasks and get acquainted with their mock companies better.

### Option 1

In the classroom and/or online

**The paperclip method**, a brainstorming activity for potential uses of a paperclip, that boosts creativity and highlights the value of teamwork.

### Option 2

In the classroom and/or online

**Brainstorm cards** help to set students in a direction that is solution-oriented, optimistic and collaborative. The teacher can create a set of four to ten cards with a title of a well-known company and a short description of the company's successful product, idea or an app. The companies should serve as an inspiration for students, so they can include the names of companies or people related to the students' major. For example, the issue on the card states: Imagine your customers moved to a new country every week, how would you solve this situation / what would you offer for your client? On the card, there is also an inspirational example of REVOLUT, stating that "Revolut banking service is fully global: it can be opened online anywhere in the world, accepts payments in every currency, and charges no, or very small, fees regardless of location". Students then brainstorm their possible solutions for the client.

## Example:

### *The paperclip method*

This task not only boosts creativity but also points out the benefits of teamwork.

Start by showing the group of five or six students a large paperclip, and give them 5 minutes to write down as many uses of a paperclip as possible. After the five minutes, the groups are asked which person has the most uses listed on their paper. The number of possible uses the person with the longest list has mentioned is recorded.

After that ask, the first person of the group mentions their first use. The teacher asks the rest of the group to delete the item (if they have the same) on their paper. This continues with the second, the third, and so on. Everybody has to mention one item at a time!

The facilitator writes down every possible use mentioned, without any further discussion. When all possible uses are mentioned, the facilitator counts all of the items which are written down on the whiteboard.

After that, the teacher allows students to share their opinions. Students will say that use No. 1 looks a lot like use No. 20, for example. This is a good bridge: the teacher can say that a brainstorm should not be started with pre-discrimination or clustering but that the clustering will be done following the brainstorm.

After that, and with this exercise in mind, participants will be better able to do a brainstorm about any issue that needs a brainstorm, because it is proven that brainstorming works.

Reflection time. After all groups finish presenting their ideas, a discussion of the process of group work is encouraged: e.g. what did the students find the most difficult about this task, what did they enjoy?

### *Brainstorm cards*

This activity also helps to boost students' creativity; the best results are achieved in a group setting.

The teacher can create a set of four to ten cards with titles of well-known companies and a short description of each company's successful product, idea or an app.

The cards with specific well-known company descriptions are given to students for brainstorming, the teacher distributes different cards with a specific company for different group of students; OR the teacher shows many cards and the group of students chooses the card they feel the most comfortable with.

Each team has about 20 minutes for brainstorming, afterwards they have to present their ideas to the entire group. This can be supported by ICTs both in face-to-face and distance modes (e.g. use online mindmapping, conferencing, messaging, polling tools or shared documents).

Reflection time. Discussion: what did the students find the most difficult about this task?, what did they enjoy?, etc.

### **Tips for the teacher:**

- These activities are meant as a warm-up and help to break the ice among the students.
- The teacher may select one task out of the given two or do both depending on the time limit.
- The teacher may use the given cards for possible mock situations or create their own.
- Always leave some time for final reflection, where students can share their feelings about the group work process.

## **ACTIVITY 2: Team work through ideational techniques**

This activity revolves around (cultural) factors affecting the teamwork experience, and aims to help students in developing self-awareness of such factors and resulting behaviors, as well as approaches for creating a good teamwork environment.

### **Option 1**

Case studies to illustrate and analyse teamwork situations at the workplace. Case studies to illustrate and analyse teamwork situations at the workplace.

### **Option 2**

Discussion of behavioral dimensions potentially affecting teamwork, including reflections of others' and one's own behaviors, and approaches for creating positive a teamwork environment.

### **Example:**

**Option 1:** Studies on teamwork situations are provided for the students. They are asked to analyse what was appropriate, and what could be perceived as inappropriate. Students can analyse it individually, in small groups, or together in the classroom. A list of potential violations could be made after the discussion. Also, students can create a code of effective working environments/a list of formal requirements.

#### ***Analysis of a few sources based on positive working environments:***

<https://www.indeed.com/career-advice/career-development/positive-working-environment>

**Option 2:** Students receive a list of behavioral dimensions important for teamwork (e.g. Hofstede's culture dimensions, see link below).

They are asked to individually reflect on their own positioning, and then look up "their" and the target language's culture(s) and compare. Afterwards, they should discuss the following questions in groups:

- 1. How differences in the individual dimensions could affect teamwork situations,***
- 2. How such differences could be productively addressed and resolved,***
- 3. Which advantages and dangers such stereotyping might have.***

At the end of the class, teachers should sum up discussions, especially stressing the importance of being aware of cultural differences in communication, but also of being critical of stereotypes (here the comparison between students' personal positioning on the dimensions and their presumed national positioning may be helpful).

## Tips for the teacher:

- If the target language is spoken in more than one country and/or continent, students could compare the differences between the cultures: what is acceptable/unacceptable there in teamwork or in work environments, etc.
- Since the activities have a strong focus on cultural differences, there is a risk of stereotyping. The teacher should make sure to address this issue in debriefing.

## ACTIVITY 3: Brainstorming clients' needs / identifying problems

This activity consists of two parts: *How might we?* and *Storyboarding*

This is the part where students go back to the mock situation/client and brainstorm to identify the client's needs. The process consists of two parts, although they can be merged into one. This is a creative and concentrated process; students should be provided with an environment that facilitates free, open, and non-judgemental sharing of ideas.

### Part 1: How might we?

Students are introduced to the idea of a 'customer' and 'their needs' by asking questions. Afterwards, they start generating ideas addressing them.

### Part 2: Storyboarding

A storyboarding activity helps to establish (a problem/client's need) and handle it as a narrative through creating a specific scenario, visuals, and/or corresponding captions.

## Example:

**Part 1: How might we?** The teacher prepares slides or any other visual material where the problem from the cards (given in the Teacher powerpoint) is introduced, for example: *WHAT IF you gave your customers something unexpected? Go the extra mile: surprise your customers with a present, a nice message or smart packaging. Tomorrowland, a world-famous music festival, delivers its tickets in an artsy box. Their stages feature detailed decorations. Even their garbage collectors wear themed outfits. WHAT other suggestions could you come up with?*

Students might be given texts, podcasts, and videos in order to familiarize themselves with 'customer needs' ideas (for instance, video1; blog1; podcast1; podcast2)

After students get acquainted with the material, they brainstorm the problem, misunderstandings regarding 'reading the customer's needs' and fill in their 'How might we?' worksheet (can be found on Teacher's powerpoint) where they write down their ideas of how they might help their mock client.

Then, they should discuss drawbacks in groups and with the teacher.

To encourage creativity and open-mindedness, do not reject any ideas. Remember that the aim is to generate as many ideas as possible. On top of accepting all ideas, encourage participants to build on the ideas of others by using the 'yes and...' phrase. This will lead to more interesting ideas and perspectives.

**Part 2: Storyboarding activity process example.** Teacher and students sketch out an idea of how a potential client/user may use a feature through visualization. Ideation storyboards should be used as a means of conversation rather than a lasting artifact or prioritization tool, as your scenario will most likely change once you are using real data. Keep in mind that storyboarding may not only be created in a traditional format on a board/whiteboard, but it can be presented as a digital story through pictures, words, text, photos, videos and gifs. The easiest tool for creation of such a storyboard could be Padlet or some other online tools that allow creating collages of visual resources.

Explain to students that the ideas they collected in their 'How might we?' worksheets should be used for this task.

Let students know that they should start by having a discussion of the timeline and steps their mock client might take. Each step should be drawn on a Post-it and placed on a whiteboard or wall, or on an online platform that allows adding input, e.g. Padlet. One or more people can be designated to draw, as long as the discussion is happening as a group.

Define the persona and the scenario or user story represented (it can be the same with the client X needing an app for managing their remote employees work). The scenario should be specific and should correspond to a single user path, so that your storyboard does not split into multiple directions.

Students can use advanced illustration skills to create a beautiful comic-book-quality storyboard.

After the students are done with their storyboard in their groups, it is time for discussion and feedback.

### **Tips for the teacher:**

- When online, use breakout rooms for group sessions and a smartboard for digital storyboards.
- Shared content and collaborative platforms like Padlet can be used for digital storyboards when working online or in person.

## **ACTIVITY 4: Collecting and refining ideas**

After the students generate and structure their ideas, it is time for collecting and refining the most suitable ones. For this, an **Affinity diagram** is a great tool that gathers large amounts of data (ideas, opinions and issues) and organizes them into groupings based on their natural relationships. The activity helps to make connections between ideas that will help students uncover patterns or themes.

### **Example:**

Ask students to put pieces of data, facts, drawings, ideas, and observations, related to the company/customer students worked on in previous parts of the book, onto post-it notes, cards, or pieces of paper and put them up on wall charts, white boards or, e.g. Padlets and Jamboards.

In groups encourage students to look for relationships between individual ideas and have team members simultaneously sort the ideas (without talking) into 5 to 10 related groupings. Repeat until all notes are grouped. It is fine if some ideas do not seem to fit a group. It is very important that nobody talks during this step. The focus should be on looking for and grouping related ideas.

Once this step is done, students can start discussing the shape of the chart in groups about any surprising patterns. Make changes and move ideas around as necessary. When ideas are grouped to the team's satisfaction, select a heading for each group. To do so, look for a note in each grouping that captures the meaning of the group. Place it at the top of the group. If there is no such note, write one. Often it is useful to write or highlight this note in a different color (an example of a possible affinity diagram).

## Tips for the teacher:

- The teacher should supervise the discussions of student groups and guide them when they feel lost.
- More examples of Affinity diagrams could be shown for students for better understanding. Remember that the key here is not to work with a large amount of data but to learn how to organize the ideas/data that they have collected.
- The usage of online tools like Padlet, Canva, or Visme is advised for easier and more impactful presentation.

## ACTIVITY 5: Collecting and refining ideas

The final step of ideation is to finalize the gathered and refined ideas. Once students finish brainstorming and categorizing, they can start narrowing down to the best idea, solution, or strategy. The so-called Post Voting method allows them to vote and express their opinion towards the best given ideas.

The following questions can help start the discussion:

*Does the idea really meet the goals set initially?*

*Does the idea meet the requirements in our problem statement/point of view?*

*Is the idea different enough from what exists to add additional value?*

*Do we have access to the budget, and is there enough to implement it even partially?*

*Is the technology needed available?*

**Post Voting method according to How-Now-Wow matrix** (adapted from the website <https://gamestorming.com/how-now-wow-matrix/>)

Students are given a set number of Post-it stickers when working in class / or each can use their own digital portfolio/board (e.g. Padlet) for online classes.

Once students have all the ideas, they are written on a board, storyboard or e.g. Padlet, then each has to choose the most appealing ideas on their individual Post-its.

Students rank the ideas according to the Four Categories method, which entails dividing ideas according to their relative abstractness, ranging from the most rational choice to the 'long shot' (most rational; most delightful; darling; long shot) (they can be renamed according to the topic or specificity of the idea).

There is a discussion after everyone has finished, the key is to not dismiss any ideas or describe them as 'bad' or 'unsuitable'.

## Tips for the teacher:

- The teacher can use the questions that are given to help students or create new ones.
- The teacher should encourage a reflection discussion at the end of the task, reviewing how students felt about the overall work at this stage / if they feel like they learned new techniques or ways to help them brainstorm ideas, etc.
- When working online, students in groups could add their ideas on a survey platform as closed questions or ranking answer options and everyone should prioritize their choices. This way, data on the most preferred topic will be collected and can be easily visualized. As an alternative, a polling tool (e.g. Mentimeter) could be used to rank the choices and show them to peers, have additional discussions, or engage in other relevant activities.

## SELF-EVALUATION QUESTIONS

- 1. How did the activities in this unit encourage you to explore your reativity? Where else can you draw inspiration from when coming up with new ideas?*
- 2. What challenges did you encounter while working in a team, and how can you become a better team player (and support others in doing the same)?*
- 3. How did the suggested activities help you/your team arrive at a particular solution or idea?*
- 4. What helped you in overcoming difficulties or disagreements?*
- 5. What do you think is the best approach to selecting one within many ideas? What aspects did you consider when making your decision and how do you think individual ideas' advantages/disadvantages should be prioritized in the selection process?*
- 6. What can you do to make sure that you really design a solution that fits your clients' needs best*
- 7. What challenges do you think you may encounter working with clients, and how do you think you can best overcome them?*

**UNIT**

**3**





# Description

# 3

## Prototype and test

**Learning outcomes.** GC and EC skills to be acquired:

**Openness**  
Emotional strength

**Social intelligence**  
Global mindset

**Flexibility**  
Cultural knowledge

In the Prototype & Test stage, students firstly get to identify different types of personalities, while analyzing the market, and conveying information in diverse situations and contexts. Secondly, the ideal consumer is created. Furthermore, the team practices public speaking with their team members and afterwards, they give positive feedback and feedback in a low risk style. Furthermore, question formation and networking methodologies are tested and afterwards, they identify the target audience, identifying their needs and wishes. They analyse and structure the collected information. Finally, the prototyping of a final product is practiced, pitching and defending one's ideas are demonstrated for the group members.

## Activities & Preparation

Teachers might prepare lectures' slides and/or handouts with clear step-by-step instructions on what needs to be done. As an alternative (esp. in the asynchronous learning mode), teachers can prepare explainer videos and tutorials with instructions.

Make sure that students have access to the relevant (technological) infrastructure; if specific online platforms are used, students might need training on how to use them (i.e. installation on devices with different operating systems, Internet connection, getting acquainted with user's interface, etc.).

Make sure that students have access to a variety of tools and/or tangible objects that can be used to build their prototype. In distance/blended learning, they can be pre-taught to use e.g. CAD tools whereas in traditional classroom environments, they can either bring their own materials (e.g. scraps or anything else that can be re- and upcycled to build a tangible prototype) or use what is made available to them by the teacher/university/etc.

The activities covered in the unit are as follows. **Core activities are highlighted in blue** and other activities are optional. Approximate timings are indicated in brackets.

**During Prototype and Test stage, students will brainstorm ideas for a mock client through the following activities:**

**ACTIVITY 1: Cultural knowledge about target markets and communities**

**ACTIVITY 2: Pitching**

**ACTIVITY 3: Attending meetings with real life professionals**

**ACTIVITY 4: Creating a prototype**

**ACTIVITY 5: Pitching to business angels (potential investors)**



# Activities

# 3

## ACTIVITY 1: Cultural knowledge about target markets and communities

The following are the warm-up exercises which could be done after all the stages of Design thinking. Students finally have the necessary skills to prototype the actual product and test it in the market. These warm-up activities give students the opportunity to understand the market and recognize the needs of a regular consumer, later offering them a (potentially) tangible and plausible solution.

### Face-to-face mode

#### Option 1

##### Market analysis

Students get (or collect themselves) a few handouts with the detailed descriptions of global/local companies (e.g. their codes of business ethics, mission and vision). After analysing these descriptions, students are asked to create a persona (a prototype of a typical customer for each of these companies).

#### An example of a case

The students are provided with the handouts, listing the possible consumers.

*What is the gender of a possible consumer?  
What might their regular income be?  
Does your regular consumer live in an apartment or does s/he own a private house?  
What are the eating priorities of the potential consumer? (Vegetarian, vegan, etc.)*

#### Possible analysis of target markets

You have to know your clients. To begin with you have to collect information about people you already know. Furthermore, recognize groups of people who do not fit into demographic boxes. Finally start with market segmentation. Create a typical customer for your company, a market research:

Use a realistic name (do not use the names of your colleagues). What is the attitude? What are the goals? What are the constraints?

### Distance learning mode

#### Option 1

##### Market analysis

Students visit a few websites of some global/local companies. They analyse the market, the production/ service of the company. Later, students are asked to create a typical customer of the given company. They can prototype an actual image of a regular client/customer.

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Use a realistic name (do not use the names of your colleagues). What is the attitude? What are the goals? What are the constraints?

## Example:

*“Stacey, 22 years old, studies mechanical engineering. Her biggest constraints are lack of motivation and difficulties with time-management. Stacey is vegan and works out 3 times a week. Her monthly income is 1000 Euros. Stacey is open-minded and willing to try new technologies to improve her practice quality”.*

*“John, 19 years old, studies fashion engineering. He is hard-working and very motivated, schedules every single task in his life. He tries eating healthy, however, fast food is a way to save some time for your studies. John participates in many after study activities. His monthly income consists of a scholarship and some random gigs. Approximately, he gets 1500 Eur per month”.*

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## ACTIVITY 2: Pitching

### Face-to-face mode

#### Option 1

##### Monroe's speech

Monroe's speech is a technique for organizing persuasive speech. The technique consists of 5 steps. Following the steps the students would gain the skills of public speaking and persuasion.

Students practise to get audience's attention (using different techniques such as quotes, rhetorical questions, shocking statistics, etc.)

Establish the needs (the students gives more details about the problem to clarify it to the audience member)

Satisfy the need of a target audience (the students explain why the solution is relevant to the audience members)

Visualize the future (possible scenarios are discussed, focusing on the main problem, formulating what if sentences)

Present actualization (giving audience some food for thought, summarizing the previous steps and discussing future perspectives)

## Example:

The students share three shocking facts/statistics to draw the audience's attention. It could be food

### Distance learning mode

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## Example:

The students share three shocking facts/statistics to draw the audience's attention. It could be food

consumed per year in the world, water wasted around the world per month, etc. Then a relevant problem of the audience is presented. Something that would be relevant to everyone, e.g. lack of time, food waste at home, etc. Furthermore, the facts are given and the solution could be briefly discussed.

E.g. preparing a shopping list in order to avoid food waste. Visualization of the future could be carried out in two ways. The positive way is to tell what would happen if the solution is applied. E.g. we are using shopping lists buying only necessary food products, reaching zero waste step by step. The negative way is to tell what would happen if the solution is ignored. More and more food will be lost, the bigger part of the population will be starving.

### Follow up

#### The hamburger method of constructive criticism

The hamburger method is a method of constructive criticism. This is a way to give your feedback in a polite and constructive way, to help others to improve their ideas without getting offended. The key principle of the hamburger method is to criticise including initial and final complementing.

The students are offering a critique and begin with a constructive compliment; then students criticise the opponent in a discussion. Finally, a few more constructive compliments are given.

In face to face activities, teachers can also draw students' attention to their body language, various kinds of gestures.

### Option 2

#### Pitching

Using voice modulation as a technique to improve your public speaking.

Students are introduced to the importance of pitch (the volume of your voice) in public speaking in order to get attention, persuade the listener, emphasize the key points, etc.

Informational, grammatical, illocution, attitudinal, and textual pitches are described.

Students are asked to demonstrate the change of pitch in their speech;

or

To recognize it in the given videos.

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In distant lectures, the feelings could be discussed, do students feel comfortable? Do they want to turn off their video cameras for some moments?

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or

To recognize it in the given videos.

### Option 3

A quick and innovative way to present your product is Pecha Kucha. There is no need to use redundant facts or overcrowded slides. In Pecha Kucha students use just pictures. They have 20 pictures and 20 seconds to describe each one.

Students are training to present their product using 20 images each for 20 seconds.

#### Example:

The students are provided with the topic, e.g. Cutting-edge technologies. More specific topics could also be given, such as **cutting-edge technologies in medicine**, or an exact technology can be chosen: virtual reality glasses and their application. The students choose 20 pictures for their report, based on the topic. It could include photos, graphs, even memes. The students then present the topic showing the pictures one by one, having 20 seconds per picture.

During face-to-face lectures, the students should decide on time-management. Are they going to follow the chronometer or practice the speech in advance? Checking if 20 seconds is enough/too much for 1 picture.

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During distant lectures, it is easier to follow the time. If needed, the timer could be used as well.

## Tips for the teacher about the integration of pedagogy, technology, and content:

Worst job interview example <https://www.youtube.com/watch?v=Qm1eAOzMy8k>

The students watch the video of an interview. There are plenty of mistakes demonstrated (e.g. inappropriate questions, discrimination, etc.) Students are asked to identify the violations and share their experiences of job interviews.

#### Tips for the teacher:

- Teachers could find more public speaking techniques to apply in their lectures.
- Knowing their students better, teachers may choose the technique which would give the best results.

## ACTIVITY 3: Attending meetings with real life professionals



### Face-to-face mode

#### Option 1

##### Having a discussion with the professionals of different fields.

A few professionals are invited to the lectures. A roundtable discussion could be organised. The professionals from different fields could be invited (academic staff, entrepreneurs, employees of some global companies, researchers, business market experts, etc.) perspectives)

#### Option 1

##### Preparing and conducting interviews

Students are analysing the market. They have to choose a public figure, a professional in their field. The students are asked to prepare a questionnaire for an interview with the famous personality. Later on, one of the public figures could be invited to join the lecture or the best interview could be sent by e-mail to the actual person.

### Example:

Roundtable discussion examples:

*Define your goals (aim and objectives of your discussion)*

*Invite the right people*

*Set an agenda*

*Share results*

### Distance learning mode

#### Option 1

##### Meeting professionals online

"Mystery skype" educational game could be carried out in a few different platforms (Zoom, BigBlueButton, etc.). Students are meeting professionals from different countries. While formulating different types of questions, students are asked to guess the location, the company and its main production.

#### Option 1

##### Preparing an interview

Students are analysing the market. They choose a public figure and create a list of questions they are curious about. The students could be asked to contact the secretary/communication staff of the famous personality. Also, the previous interviews of the discussed personality could be analysed. What are the typical questions given to famous entrepreneurs/engineers? Do these questions differ according to gender, age, and position at work? Which of the questions are ethical/unethical?

### Example:

The students are having an online meeting with some people. They do not know their location, profession, etc. The idea is to formulate various types of questions and to guess the country/company/occupation of an online speaker.

### Tips for the teacher about the integration of pedagogy, technology, and content:

- The teacher invites students to join a virtual meeting room, create their avatars and work in groups.
- Sims style virtual rooms

## ACTIVITY 4: Creating a prototype

### Face-to-face mode

#### Option 1

##### Lego structure copy:

The students are working in small groups of 3 or 4. The same amount of Lego bricks is given to each group. Each group has the same amount of bricks, identical in its form. The students are choosing the roles inside the groups: the leader, the architect, the journalist, etc. The journalist sees the building made out of the bricks. He/she describes it to the leader. The architect is asked to build the identical figure according to his/her leader's explanations.

### Distance learning mode

#### Option 1

##### Minecraft copy

The students are asked to download a version of Minecraft. Then, all students are distributed in groups of 3-4 people. Each group gets a picture of a specific structure. Students are asked to recreate the model in the given program.

### Option 2 Simulation

Students are provided with a simulated scenario by the teacher. The domain, target audience and the objectives are given before the lecture. Students are asked to prototype a solution.

Problem solving, decision making and creativity skills are improved.

### Option 3 Role play

Students are asked to work in pairs or small groups to create a prototype of their product. The roles may be prescribed by the teacher or the students can choose from the given list:

e.g. the leader, the researcher, the presenter

The conversations among the team members could be represented using the **Scratch** program (if working in the computer class) or simply demonstrating dialogues in the classroom.

### Option 4 Performance

Infographics could be used to represent a prototype of each group of the students. A limited amount of time is given to each group.

If a tool is new, a short tutorial could be provided.

### Option 5 Recycled materials

Students are asked to prepare a model of their product, using recycled materials. The types of materials and the number of pieces could be limited according to the task.

### Example: (Option 1)

There are a few variations of the lego challenge:

The students are distributed into groups. Each group prescribes the roles to its members: the architect, the builder, the presenter. The first person gets to see the lego structure (it could be a type of building, e.g. a semi-detached house). The first person (researcher) passes the information about the forms and necessary parts to the architect. The architect prepares a list of necessary lego parts for building the model. The builder tries to recreate the model from the given parts and recommendations. The first person (researcher) could take a look at the picture once in a while and give recommendations to the architect.

In the distant mode, programs such as Matlab could be used instead of an actual building from lego blocks.

### Option 2 Simulation

Students are provided with a simulated scenario by the teacher. The domain, target audience and the objectives are given before the lecture. Students are asked to prototype a solution.

Problem solving, decision making and creativity skills are improved.

### Option 2 Simulation

Students are asked to work in pairs or small groups to create a prototype of their product. The roles may be prescribed by the teacher or the students can choose from the given list:

e.g. the leader, the researcher, the presenter

The conversations among the team members could be represented using the **Scratch** program.

### Option 4 Performance

Infographics could be used to represent a prototype of each group of the students. A limited amount of time is given to each group.

If a tool is new, a short tutorial could be provided.

### Option 5 Recycled materials

Students are asked to prototype a model using **Autocad** or **Matlab**. The recycled materials are seen as key elements of a prototype.



## ACTIVITY 5: Pitch to business angels



### Face-to-face mode

A simulation of a start-up fair could be organised. A few well-known entrepreneurs, students from other groups, and/or academic staff members could be invited for a discussion. The students are asked to present their business idea in a short period of time.

Plenty of presentation strategies could be practiced beforehand (Padlet, Powerpoint presentation, mindmap, a kind of performance)

**All the previous skills and methods could be applied to the last part (Monroe's speech, Pecha Kucha, Hamburger method, etc.)**

### Distance learning mode

A simulation of a start-up fair could be organised via zoom, bigbluebutton or any similar platform. Some famous entrepreneurs, students from other groups, members of academic staff or their representatives could be invited to join the virtual meeting. The students are asked to present their business idea in a short period of time.

Plenty of virtual platforms could be used. Students may be asked to share their screens, to use the virtual white board, padlet, paint, or any other program, all discussed in advance. A few kinds of 3D meeting rooms could be suggested for the virtual meeting to make it more realistic. Students and entrepreneurs could be using their avatars.

**All the previous skills and methods could be applied to the last part (Monroe's speech, Pecha Kucha, Hamburger method, etc.)**

### Activity

Brainstorm (white board): What collaboration tools are you familiar with?

#### Individually:

Teacher provides a text in the target language. Students have to define the pros and cons for every tool. (suited for asynchronous learning)

#### Group work:

Students define which tool they are going to use and present it in plenum by justifying their choice.

### Example:

The students think about a mutual problem (e.g. time-management). They create a program (digital planner) for students. The group of students discuss the plan to create, test and install the program. The possible costs (time, money, etc.) are analysed. After the prototype of a program is prepared, students present their product to a group of well-known entrepreneurs or teachers of their university. The jury is commenting on whether they would invest in the project. The advantages and disadvantages of the product are listed.

### Tips for the teacher about the integration of pedagogy, technology, and content:

The examples of Angel Investor could be provided beforehand. There is a great variety of videos regarding the topic. E.g. Dragons' Den, a BBC program of budding entrepreneurs who get 3 minutes to pitch their business to 5 multimillionaires.

## SELF-EVALUATION QUESTIONS

- 1. What does the market analysis give to the student as an entrepreneur/customer?*
- 2. Could Monroe's speech be applied in a broader context (daily life conversations)?*
- 3. How is Hamburger method different from other methods of criticism?*
- 4. Is voice modulation technique a challenge to students or teachers more?*
- 5. In what ways is Pecha Kucha more efficient in comparison to PowerPoint presentation?*
- 6. Creating a prototype (Lego structure copy). Which skills do students gain during this activity?*
- 7. Should the teacher prepare the simulation or could the groups of students prepare it to their colleagues?*
- 8. Business angels. What challenges may be faced by the students during preparation/delivery of the task?*

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## ABOUT THE PROJECT

This e-book has been prepared as a part of the BADGE (Becoming a Digital Global Engineer) project, a collaboration of GELS (Global Engineers' Language Skills) network members.

The overall goal of BADGE is to inspire language and communication education at engineering schools and departments. BADGE members design teaching and learning materials for engineering students. The materials are available on an Open Educational Resources (OER) platform.

Find out more about BADGE: <https://www.thebadgeproject.eu/>

Find out more about GELS: <https://www.clic.eng.cam.ac.uk/news/GELS>



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