The Atom model

1.
Explore

6.
Evaluate

2.
Analyse

The
Challenge

5.
Realise

3.
Ideate

4.
Prototype

A guide to Innovative and Entrepreneurial Learning Processes

The Atom Model

A guide to Innovative and Entrepreneurial Learning Processes

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Table of Contents

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6

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7

The Atom Model

The Atom Model that we developed for ForEMLink 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 placed in each phase of the Atom Model and its challenges. The Atom Model contains a process and activities that teachers can use to facilitate the development of entrepreneurship in students. It is based on a partnership perspective on how one may integrate entrepreneurship as a natural element in the preparation of Higher Education didactics.

The Didactics of the Atom Model

The Atom Model that we developed for ForEMLink 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 process and activities that teachers can use to facilitate the development of entrepreneurship in students. It is based on a partnership perspective on how one may integrate entrepreneurship as a natural element in the Higher Education courses.

The Atom Model is designed in a way that makes it possible to use all its elements. However, one may also select activities from specific elements that seem most meaningful for the educational courses that the teacher is preparing. Similarly, one may select activities related to the subject and curriculum criteria of an existing course. With this flexibility, the entrepreneurial activities can be adjusted to the subject area with the specific didactics employed within the timescale that the teacher has at their disposal.

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. Through the six elements, 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 is unknown and it may take students several attempts to find it. It is therefore essential to be open to new solutions and not to assume that the solution 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 an understanding of real challenges to intense idea generation. Subsequently, it switches to a process through which the ideas with the greatest value are selected. These processes promote an entrepreneurial mindset, increased motivation, creativity and the generation of new solutions.

The element of unpredictability reflects reality - the immensely complex reality in which Higher Education graduates all over Europe are immersed once they begin their careers. Thus, this form of training develops entrepreneurial competencies and prepares students to handle real and difficult, but solvable, challenges developing competencies that are in high demand among employers.

The labour market for Higher Education graduates across Europe is characterised by multidisciplinary collaboration and an entrepreneurial mindset. We consider entrepreneurial competencies essential for all graduates, as well as students across study programmes.

Entrepreneurial competencies are in increasingly high demand and vital in a dynamic and globalised society.

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 being able to apply it in both simple and complex contexts. Partnership members believe that students must be trained to understand that 'real-world' often differs from the technical theories and academic criteria of higher education. Danish entrepreneurship researcher Anne Kirketerp defines the term '*self-efficacy*' as "the competence to implement actions of change which possess (positive) values to oneself and others" (Kirketerp A, 2019). The Atom Model starts with a practice-oriented challenge: the paradigm through which students are trained to handle real-world challenges.

The Atom 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 applied as an inspiration for concrete initiatives.

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. We view it as a contribution to the development of teaching plans so that entrepreneurship may be integrated into lessons as a natural element.

In the entrepreneurial process, it is essential that students are given a clearly defined task that both incorporates the demands of the curriculum 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 facilitator

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.

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).

How to work in the Atom Model

A linear process from elements 1 through 6 is a good way to start if one is unfamiliar with entrepreneurial processes. It is possible to 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, new activities can be developed. These activities can then become part of an individual's unique Atom Model toolbox.

We would be more than grateful if you sent your activities to us so we can upload them to our platform, where we will credit you as their inventor and send you a printed version of the Atom Model as a token of appreciation.

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 number of
participants

Inspiration

The duration of
the activity

The materials used for the
respective activity

The purpose of
the activity

Description of
the activity

Reflection

Sphere Activities

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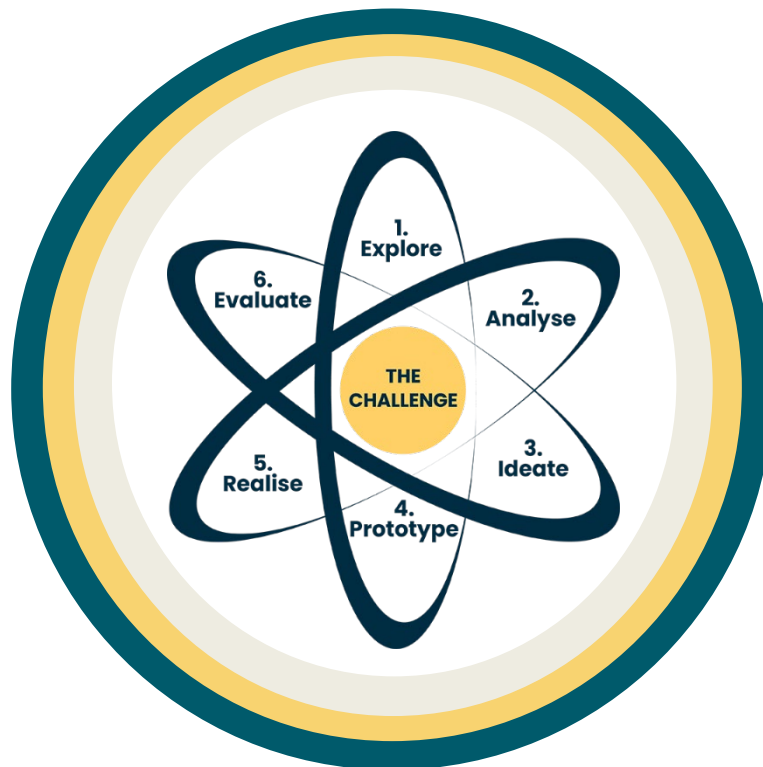
The Learning Sphere circulates around the 6 elements of innovation in the atom; the spheres are social, physical and mental. The spheres are important for the teacher to work with since it influences the 6 elements of Innovation.

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

If the students are to develop 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 social, physical and mental learning sphere. 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 in 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.

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14
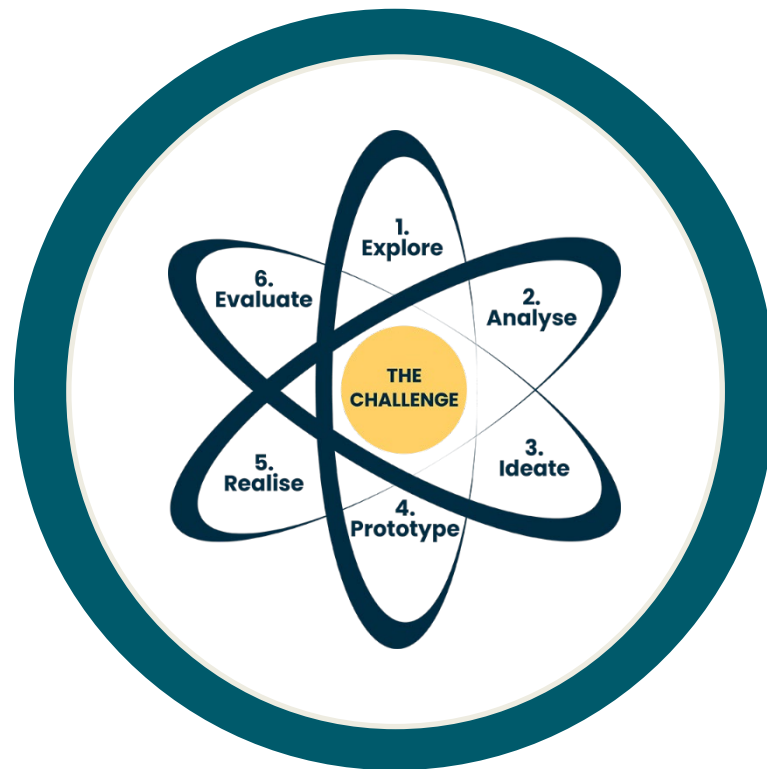
A.　Mental

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 soluble dilemmas in practice. A part of this 'possibility' mindset is to act when dealing with problems.

For some students, the entrepreneurial mindset and 'possibility' and creative thinking requires practice as it is unfamiliar to them, and they are unaccustomed with 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 a 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.

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16

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.

10-20 mins   16 students   Whiteboard, picture and word cards

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). The teacher informs the students that they must plan the annual party in pairs e.g., a summer party or Christmas party.
2. The teacher hands out the word or picture cards and tells them NOT look at the cards they are given. If they do this, they must be given new cards.
   - If they are given word cards, they get one each.
   - If it is a picture card, they are given four each.
3. The teacher then demonstrates how the students can begin to plan the party using the cards:
   - 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.
4. The students work with one word/picture at a time and may not peek at the other cards to see what else they will have to implement.
5. The students link all the ideas together as they appear to create the annual party.
6. After seven to ten minutes the teacher stops the activity and asks the students to present their ideas for the party.
7. The teacher may ask the students if they wish to share their ideas to the class on what a good party would be like. More ideas are shared which may energise and motivate the students to create their party.

Reflection

In this activity, the students are given the opportunity to release their imagination to plan the annual party together "Yes and…" are important questions for all the exercises in the ideation element of the Atom Model. Students should choose the type of party that is relevant to the context e.g., the time of year or where you are.

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

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.

5-10 mins   2-40 students   Whiteboard & bag with different things

Steps

1. The students form one big group.
2. The students take one object each from the bag.
3. The students pair up with someone who has the same-coloured trousers as them or someone wearing ones that are a similar colour.
4. The teacher demonstrates how to present oneself based on the object chosen from the bag.
5. The students are given 2-3 minutes to present themselves based on the object they have chosen.
6. The student must listen attentively to their partner.
7. 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.

The activity could be done using online tools such as Padlet, virtual whiteboard and breakout rooms in Teams/Zoom. Smaller groups should be used when doing this activity online to avoid students having to wait a long time to present themselves.

A.3 Giving Presents

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

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

20-30 mins   16 students   Whiteboard

Steps

1. The students are asked to pair up with someone who has the same-coloured shirt as them or one that is of a similar colour.
2. The teacher instructs the students in giving imaginary presents to their partners and responding to the receiving of a present with the phrase "Yes, and ...". The teacher demonstrates this with a student. The recipient decides what this imaginary present is with the only limitation being the individual's imagination.
3. The students take it in turns to give each other imaginary presents until the five 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 activity could be done using online tools such as Padlet, virtual whiteboard and breakout rooms in Teams/Zoom.

A.4 Lateral Thinking with de Bono's Six Hats

Mental   *Author:* Patricia Huion   *Facilitated by the Teacher*

The aim is to create a non-judgemental mindset.

1-2 hours   16 students   Whiteboard, hats, crayons, paper, pen, picture card & post-its

Steps

1. The teacher places six coloured Hats in a prominent place around the classroom.   The Hats could be white, black, red, green, blue, yellow or black hats with ribbons. The teacher introduces the Hats and explains the meaning of each one.
2. The teacher asks the students to sit in a circle (or circles of six for large groups). The students introduce themselves to each other.
3. The teacher introduces a challenge e. g. How to keep students connected during Covid-19.
4. The teacher asks the students to write down as many solutions as possible to the challenge in the middle of a sheet of paper. This can be done individually or per group.
5. The students pass the page to their neighbour on the left who then writes either new solutions or gives feedback on what is already written. The process should be repeated twice.
6. The teacher asks the students to collect the solutions and group similar ones together.
7. The students then place the appropriate hat over a group of similar solutions.
8. The teacher asks the students to reflect as a group on the following: Which is the most popular Hat? Which is the least popular one? Can more solutions be added to the Hats?
9. The teacher asks the students to work in pairs and take it in turns to tell each other which Hat suits them best.
10. The teacher and the students discuss the results of the activity and consider the following: How can you use the Thinking Hats in your practice as an entrepreneur? (1min per person).

Reflection

Additional help on using the Six Hats can be found at: http://www.ideasforideas.com/

It is essential that the students are aware of the meaning of each of the coloured hats.
The activity could be done using online tools such as Padlet, virtual whiteboard and breakout rooms in Teams/Zoom.

A.5 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.

5-10 mins   16 students   Whiteboard

1. The students pair up with someone who has the same size thumb as them.
2. The teacher tells them to tell their partners about their mornings up till that point. Their descriptions must be as detailed as possible (2 minutes per person).
3. The teacher instructs them in telling about their mornings, but backwards 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 issues 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, virtual whiteboard and breakout rooms in Teams/Zoom.

A.6 Yes. I've Made a Mistake

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

The aim is for students to learn to welcome and celebrate mistakes.

5-10 mins   16 students   Whiteboard

Steps

1. The students pair up with someone with the same hair length as them and stand opposite each other.
2. The teacher informs them that they will clap each other's hands in 3 different ways:
   a) With both hands x 2
   b) Left hand to left hand
   c) Right hand to right hand.
3. The teacher tells them which type of clapping they must perform - a, b or c. This should be done repetitively to reinforce the connection between the type of clapping and the letter.
4. If the students make a mistake they must, as a pair, celebrate their mistakes by saying, "Yes, I've made a mistake!" They are encouraged to smile whilst doing a celebratory gesture which should be done every time they make a mistake.
5. When the teacher assesses that the students understand the game, the teacher changes the order of the letters e.g. b, b, b, a, c, b, a, and c.
6. If the students master this, the teacher will ask them to close their eyes and will continue shouting out random letters.   If the students make mistakes, they should continue to celebrate.
7. The teacher discusses the activity with the students and stress why they must learn to make mistakes.

Reflection

This activity enables students to celebrate making mistakes to develop a creative process. Making mistakes is a core element of creating something new. This skill is part of the suite of 'innovative competencies'.

A.7 Who Knows What?

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

The aim is to highlight students' knowledge diversity and the importance of this diversity in the innovative process.

| 1-2 hours | 16 students | Whiteboard, flipchart, pen & post-its |

Steps

1. The students form pairs and interview one another about their respective knowledge domains e.g. hobbies, part-time jobs, subject fields etc. They have 15 mins each to do this and should write each domain on post-it notes.
2. The students now form groups of six and draw four concentric circles on a flipchart. The circles should look like a bullseye with A at in the centre and D being the outmost ring. These should be labelled:
   A.   Knowledge domains which all members of the group share.
   B.   Knowledge domains which some of the members of the group share.
   C.   Knowledge domains which only one member of the group possesses.
   D.   Knowledge domains which no members of the group possess but are needed to solve the Challenge in question.
3. The students place their post-its on the appropriate circle and discuss which domains they have in common, what skills are found in the unique knowledge domains and how they might gain the knowledge in the outermost circle (D).
4. When all the post-its are added a mind map of the students' knowledge domains are created on a flipchart. The students discuss how they could apply as many knowledge domains as possible to the Challenge.
5. The teacher discusses Susanne Justesen's arguments that one often chooses group members who are most like oneself and possess the same knowledge domains. However, it may be beneficial to choose someone who has different knowledge domains as this can promote innovation. It should be stressed that group diversity strengthens the innovation process.

Reflection

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

Inspiration

Inspired by: Susanne Justesen

A.8 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.

10-15 mins   16 students   Whiteboard, pen & post-its

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 post-its and place them on the whiteboard.
3. The teacher and the students review the post-its 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 Atom model.

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

A.9 Who Dares? (Who is willing to? Is there a volunteer?)

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

The aim is to convey the idea that it is easier to be motivated and to participate when we know what is expected of us.

20-30 mins

15 students

Whiteboard

Steps

1. The teacher asks for a number of volunteers (approx 3 – 4 people). This number will be dependent on the size of the group.
2. The teacher explains that this activity will generate a debate about motivations, resistance and fears etc. - it is not about participating in a specific game or task.
3. The students explain their motivations for volunteering e.g. what they wanted to achieve by doing so.
4. The students who did not volunteer should also explain their thoughts and why they did not volunteer.
5. The students take note of all the comments and review them.

Reflection

This activity shows that commitment is a clear indicator of our motivation. When we are motivated, our level of commitment is very high. We can only commit ourselves without reservation to what is clear to us.

A.10 The Paperclip

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

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

10-20 mins   15 students   Whiteboard, pen & post-its

Steps

1. The teacher asks the students to list all the uses for a paperclip they can think of - this should take approximately 1 minute.
2. The teacher asks students to analyse 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 any evidence?
3. The teacher brings the students together 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?
   - Should moral dilemmas have to be removed to reveal brilliant ideas that initially may seem absurd, disrespectful or crazy?

Reflection

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

Inspiration

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

A.11 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 mins   15 students   Whiteboard, pen & post-its

Steps

1. Each student is given a pencil and a piece of paper with 30 blank circles on it.
2. The students are challenged to fill in as many circles as possible with the aim being quantity not quality. The circles can be filled in various ways e.g. shading, drawing emojis etc. They are given 3 minutes to complete the challenge.
3. The students share and reflect what 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?

Reflection

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

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.12 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 mins   15 students   Whiteboard, pen & post-its

Steps

1. Each student is given a pencil and a piece of paper with an incomplete figure on it.
2. The students must complete the figure and title it. They are given 5 minutes to complete this.
3. The students share their pictures and reflect on the imagery, implied narrative, humour or fantasy in their work.
4. The teacher brings the students together 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/),

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

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.13 Idea Speed Dating

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

The aim is to formulate the challenge.

| 40 mins | 6 students | Whiteboard, pen & post-its |

Steps

1. The students research information on the client for the challenge:
    *   the client's profile
    *   the target group for the prototype
    *   possible resources/materials
2. 5 Students sit at different desks placed around the room.
3. The other student rotates around exchanging information from their research with the 5 students on a 1-2-1 basis.   They should spend 5 minutes with each student before moving on to the next desk. This continues until the student has spoken to all 5 students.
4. After the activity, students should write up a reflection of their experience and note what they have learned about the client from collaborating with the other students.
5. The information gathered is then used in the 'Analyse' section in meeting the challenge.

Reflection

This activity can help more introverted students flourish and can lessen the impact that dominant students often have in class discussions. It can also help others to understand wider class dynamics and to share and identify key information about the client.   It also shows that each student can do more with the help of someone else than they can do on their own (Vygotsky, 1978).

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

Inspiration

Inspired by: Muurlink & Matas, 2011

https://ablconnect.harvard.edu/speed-dating-research

A.14 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 mins   Class group   Whiteboard, pen, paper & post-its

Steps

1. The teacher gives prompts for the activity so that students can reflect on their learning, for example:
   - What was the most important idea that you studied yesterday?
   - 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 board – 'Strengths' and 'Weaknesses'. The students reflect on their points and write them under the appropriate headings.
4. The class discusses the points on the 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 many require help. Students gain confidence from reflecting on the initial learning process which allows them to develop to advanced issues.

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

Inspiration

Inspired by: Cross and Angelo (1988)

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

A.15 Creating a Flow for Learning

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

The aim is to develop a logical approach to solving problems by organising processes into a clear structure.

30 mins	Class	Whiteboard, video, post-its & pen

Steps

1. Students watch a short video on an assembly process and take notes on the key aspects of the process.
2. The students review their notes and put them in a logical order.
3. The students create a flow chart to simplify the process for others.
4. The charts should then be presented to the class or a small group.
5. The class reviews all the charts and discusses some of the observations taking note of good practice.

Reflection

This activity will make students aware of the importance of presenting information for others in a clear, structured and logical format.

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

A.16 Real Time Reactions

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

The aim is to identify the importance of structure and flow in a piece of communication.

1 hour   Class group   Whiteboard, pen & paper, video & Twitter

Steps

1. The teacher selects a short video (10 mins) that is suitable for the class group.
2. Students log into Twitter and are given a hashtag to make contributions in real time on a video shown in the class.
3. The teacher shows the class a video and students make real time comments on Twitter.
4. When the video has finished, the students review the hashtag comments. The teacher creates headings on the whiteboard and the students write down points under the appropriate headings on the whiteboard.
5. The students reflect on the activity and the teacher highlights the importance of ordering and structuring communication.

Reflection

This allows students to make instant comments about a 'live' event e.g. a presentation/video and to become aware of the importance of structure. The development of the presentation, from simple to complex, should be highlighted. Students will be introduced to new ideas and awareness of new perspectives and a method for creating clear communication. It identifies the importance of various soft skills e.g. communication. It reinforces the importance of others' opinions in gaining knowledge.

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

Inspiration

Inspired by: Centre for Academic Teaching

https://cat-database.sites.uu.nl/learning_activity/real-time-reactions/

A.17 Muddiest Point or Crystal Clear

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

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

20 mins Class group Pen & paper

Steps

1. The teacher gives the students a sheet of paper headed with two columns - 'Muddiest Points' and 'Crystal Clear' near the end of the lesson.
2. The teacher asks the students to reflect on what they have learned from lesson.
3. Students write down some comments/questions on the sheets – 'Muddiest Point' and 'Crystal Clear' - about their understanding of the lesson.
4. The teacher collects the student responses at the end of the lesson.
5. The teacher can then feedback to the students in the next lesson and inform them of how their feedback will be incorporated into future lessons.

Reflection

This mega cognitive activity enables students to review and evaluate their progress in preparation for advancing on to 'deep' learning activities. In this way, it creates reinforcement, encouragement and confidence in their learning. It offers the opportunity for help in areas that students are struggling with thus removing any unnecessary anxiety in the students.

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

Inspiration

Inspired by: Professor Mosteller (1989)
Centre for Teaching and Learning
https://teaching.uwo.ca/teaching/learning/active-learning.html

A.18 Create a Hat Pattern Picture Wall

Mental   *Author:* Patricia Huion   *Facilitated by the Teacher*

The aim is to illustrate the importance of the Thinking Hats in creating solutions.

Groups of 4   Whiteboard, Hats, pen & post-its

Steps

1. The teacher places six coloured Hats in a prominent place in the classroom. The teacher introduces the Hats and explains the meaning of each one.
2. The teacher creates groups of 4-5 students.
3. The teacher introduces a challenge for the groups to solve e.g. How to organise online shopping for a grocery shop.
4. The teacher introduces the Hats and explains the meaning of each one.
5. The teacher asks each team to experiment with the order of the hats and note the solutions this creates. The students should collect as many solutions per Hat, then role-play using different coloured Hats noting the different solutions created. For example, are there more solutions from the white hat and none from the red one?
6. The teacher discusses with the groups which solutions they prefer and why. They can create short and funny pitches to present their ideas to the other groups.
7. The teacher asks each group to create a slogan for their preferred solution. The students write their slogan next to their solution then add the Hats used and take a photo of it. For example, 'Don't worry. How could you have known?' with a green or red Hat or 'Always prepared!' with recurring black and white Hats.
8. The students place their picture solutions to the challenge on the 'Create Wall'.
9. The teacher takes a picture of the group in front of the wall and puts it on the door of the classroom.

Reflection

It is essential that the students are aware of the meaning of each of the coloured hats.
Additional help on using the Six Hats can be found at: http://www.ideasforideas.com/

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

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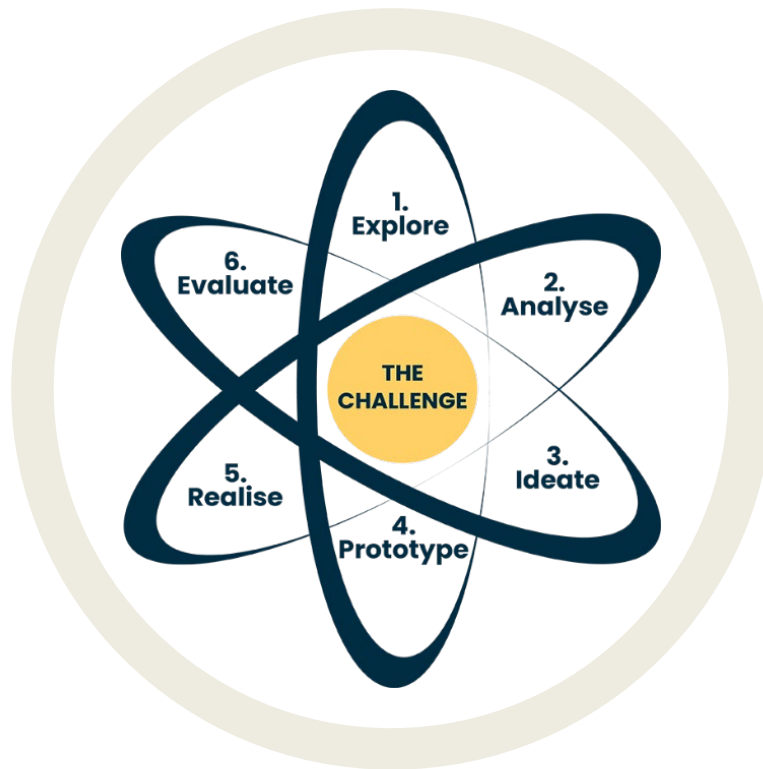
In core of the Atom Model, students work with solutions for real hyper-complex problems and for them to dare to present creative solutions. It is our experience that within the social learning spheres, it is essential that security and mutual trust among group members is present.

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 Atom model. Therefore, it is essential for the lecturer to facilitate good relations amongst the students and to choose some activities that develops the social learning sphere around the atom. Building a good social sphere includes giving the students constructive feedback of 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. These 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.

1-2 hours   16 students   Whiteboard, computer, pen & post-its

Steps

1. The students are asked to write down what they think are the most important elements that make up a good learning environment.
2. The students share their thoughts with the rest of the class.
3. The teacher stresses the importance of sharing their perspectives and valuing them so that 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 sign.
5. The teacher places the code in the classroom where it is visible to all.
6. The teacher and the students should review and adjust the code after periods of conflict and discussions about changing expectations.

Reflection

In this activity, the students should express their needs about the creation of a safe learning environment to in creating a code of collaboration. The activity could be done using online tools such as Padlet, virtual whiteboard and breakout rooms in Teams/Zoom.

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 them for the innovation process.

20-30 mins   2-40 students   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 teacher could use a ball that is given to any student who wants to speak. The students could also ask for the ball if they wish to contribute. 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

This activity creates a 'safety net' for students and may also contribute to improved student focus on the task at hand. 'Checking in' can be repeated using different methods like singing or quoting, giving high-fives or preparing a game. After each lesson, the teacher may appoint students who are responsible for preparing something for the class which should take ten to fifteen minutes to complete.

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

Inspiration

Inspired by: Lotte Darsø

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.

20-30 mins   2-40 students   Whiteboard

Steps

1. The teacher asks the students to pair-up by finding a person with the same eye colour.
2. The students think about their first childhood dream
3. The students work in pairs and tell each other about their dream.
4. The teacher discusses the outcome of the activity with the students.

Reflection

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

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

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 Atom Model.

5-10 mins　　　　　　5-30 students　　　　　　Whiteboard

Steps

1. The teacher asks the students to stand up and find a partner for the activity.
2. The students are asked to imagine themselves as an object e.g. a vegetable, a car, a tool, a fruit, a piece of furniture etc.
3. The teacher prepares the students by demonstrating the activity.
4. The students work in a pair and describe themselves to each other as the chosen object.
5. The teacher discusses the outcome of the activity with the students.

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 depending on the class.

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

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 mins   Groups of 5-10   Whiteboard, pen & post-its

Steps

1. The teacher briefly describes a situation in the form of a 'case study'. This situation must represent a typical organisational 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 they would do in a similar situation and why?
   - 2nd: what they would 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 analyse 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.

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

B.6 Who Dares? (Who is willing to? Is there a volunteer?)

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

The aim is to convey the idea that it is easier to be motivated and participate when we know what is expected of us.

20-30 mins   15 students   Whiteboard, pen & post-its

Steps

1. The teacher asks for a number of volunteers (approx 3 – 4 people). This number will be dependent on the size of the group.
2. The teacher explains that this activity will generate a debate about motivations, resistance and fears etc. It is not about participating in a specific game or task.
3. The students explain their motivations for volunteering e.g. what they wanted to achieve by volunteering.
4. The students who did not volunteer should also explain their thoughts and why they did not volunteer.
5. The students take note of all the comments and review them.

Reflection

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

B.7 The Blind Man and the Guide

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

The aim is to increase confidence and communication among team members.

20-30 mins	16 students	Whiteboard & blindfold

Steps

1. The teacher pairs students together. One of the students is blindfolded and the other student acts as a guide. The guide helps the blindfolded student walk round the room avoiding any obstacles. After 5 minutes, the roles are reversed, and the experience is repeated.
2. The students reflect on the activity and take note of their points. They could use the following as a prompt "I have discovered ...".
3. The teacher should suggest the following to help the students:
   - Did the guide inspire confidence by the firmness of their voice or by the clarity of their indications?
   - Did the guide give incorrect instructions?
   - What do we feel when we are guiding someone else - responsibility, affection, nothing special, protective instinct?
   - How to you do feel being guided? Like a toy at the mercy of the guide? Like a younger brother? Like a well-treated guest, but with a certain coldness?
4. The teacher brings the students together to discuss the responses and to identify the degree of trust existing among the members of the group.

Reflection

This is a well-known and traditional activity in Social Education.

B.8 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 mins   5-6 students   Whiteboard & box with different things

Steps

1. Each student selects a personal object that represents them and deposits this, anonymously, in a box.
2. Each student takes out an object from the box and says whom it may belong to and why. They should not choose their own object.
3. The owners of the object identify themselves and explain why they selected the object.
4. The other students can ask questions of the owner of the object.

Reflection

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

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

B.9 The Silhoutte

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 mins   6-8 students   Whiteboard, cardboard, pen & post-its

Steps

1. The teacher draws a fullsize silhouette of a person on cardboard and cuts it out.
2. The students mark on the silhouette where they think their strengths and weaknesses are located.
3. The final result is discussed with all the students.

Reflection

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

B.10 Yes, But vs Yes, And

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

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

10-20 mins   16 students   Whiteboard, pen & post-its

Steps

1. The students work in pairs (labelled A and B) to complete this activity.
2. Student A suggests doing something with Student B, who has to answer with a reason not to do it, starting with "Yes, but …"
3. 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."
4. Student A makes a suggestion, 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."
5. The students form a group and discuss what they have learned from the activity.

Reflection

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

Inspiration

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

B.11 Con Tricks

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

The aim is to develop skills to work successfully within a group.

30 mins   **Groups of 10-15**   **Whiteboard, cartoons, pen & paper**

Steps

1. The teacher places a selection of cartoon characters around the classroom. The cartoon characters should show a range of different emotions.
2. The students choose a cartoon character that represents their feelings about working within a group.
3. The students write a comment in a bubble beside their cartoon character explaining why they chose it.
4. The students then form groups and discuss their cartoon choice and how it may impact on working in a group.
5. The teacher encourages the groups to reflect on their cartoon comments in deciding how students can take responsibility and work towards achieving group goals. This discussion should help participants to overcome some of their resistance to group work and encourage students to say the 'unsayable' but also be respectful of others' views and opinions.

Reflection

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

Inspiration

Inspired by: Adapted from: Landale, A., & Douglas, M. (2007). The Fast Facilitator: 76 Facilitator Activities and Interventions Covering Essential Skills, Group Processes and Creative Techniques. Massachussetts: HRD Press.   (Activity 15, p. 37).

B.12 I am so Happy Today

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

The aim is to make the group start with a smile by connecting to each other

5-10 mins	5-25 students	Whiteboard

Steps

1. The teacher asks the students to stand up. They are to pretend that they are mingling at a party and go round and present themselves to the other guests.
2. The teacher tells all the students to ask each other "Why are you so happy today?" All the students should ask and answer the question.
3. The teacher discusses the outcome of the activity with the students using this prompt:
   - "How was it for you to start the class this way?"

Reflection

Most students will respond well to this activity as it can create a positive atmosphere in the group. However, some students may feel awkward and may need some encouragement to carry out the activity.

B.13 Marshmallow Challenge

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

The aim is to enhance team working skills by creating a physical structure.

30-60 mins   3-40 students   Whiteboard, various materials, pen & post-its

Steps

1. The teacher outlines the task to the students:
   - Each team must build the tallest free-standing structure out of 20 sticks of spaghetti, 1 meter of tape, 1 meter of string and 1 marshmallow. These ingredients should be placed in a paper lunch bag or envelope which will help to distribute them and will maximise the element of surprise for the students.
   - The entire marshmallow must be on top - cutting or eating part of it disqualifies the team.
   - The winning team is the one that builds the tallest structure measured from its base to the top - the structure cannot be suspended from a chair, ceiling or chandelier.
   - The challenge lasts 18 minutes. The structure must be self-supporting. The teams cannot support the structure by touching or holding it. If they do they will be disqualified.
2. The teacher organises the students into teams of 3-6 people. Each team should sit around the same table and work closely together.
3. The teams should use as much or as little of the materials as needed – they can cut it or break it up as required. However, the teams cannot use the paper bag or the envelope as part of their structure.
4. At the end of the activity, the teacher measures the structures and asks the teams to reflect on the activity.
5. The teacher and the teams discuss the activity e.g. How did you work as a team, who took leadership, etc?

Reflection

For this activity the following materials should be provided to each group: 20 Sticks of spaghetti; 1 meter of string; 1 meter of tape; 1 paper bag or envelope; 1 marshmallow and a measuring tape. This activity develops communication, leadership dynamics, collaboration, innovation and problem-solving skills. It teaches a lean approach to risk management and the value of continuous experimentation.

Inspiration

Inspired by: https://toolbox.hyperisland.com/marshmellow-challenge

B.14 Lego Challenge

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

The aim is to enhance team working skills by creating a physical structure.

30-60 mins

10-40 students

Whiteboard, Lego, assignments, pen & post-its

Steps

1. The teacher outlines the task to the students:
   - The students work in groups to build a structure with Lego.
   - One member from each group will be given a piece of paper with their assignment on it.
   - The students should not show or tell their assignment to the rest of the class.
   - The students will have 20 minutes to build their structure. They cannot speak during the building process.
2. The teacher separates the class into groups of 5 students. Each group sits around a table with a box of Lego and their assignment.
3. The students start their build.
4. The teacher stops the activity after 20 minutes and the students stop building.
5. The teacher asks all the groups to guess the assignments of all the other groups.
6. The students now reveal their secret assignments with each other.
7. The teacher discusses the activity with the students and asks them to reflect on how the groups worked together.

Reflection

In this activity the secret 'assignment' makes the collaborative process more challenging for the students. It emphasises group communication, leadership dynamics, conflict, cooperation, patience and problemsolving strategies.

Inspiration

Inspired by: https://toolbox.hyperisland.com/lego-challenge

B.15 The Portrait Gallery

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

The aim is to develop student interaction by collaboratively drawing portraits of each other.

30-60 mins   2-20 students   Whiteboard, markers, pen & post-its

Steps

1. The teacher splits the class two equal halves - Group A and Group B.
2. Group A forms an inner circle facing outward and group B forms an outer circle facing inward.
3. Each person in group A should be facing one person from Group B. Members of Group A, the inner circle, are the subjects of the portraits and Group B are the artists.
4. Every member of group B should have paper and different coloured thick markers. They should start by writing the name of their subject at the top of the paper.
5. The artists in group B begin drawing their subjects in Group A.
6. After 15 seconds, the teacher shouts "Rotate!" and the artists rotate one step to the left while handing their paper to the person to their right. Each artist is now standing in front of a new subject with that subject's portrait in their hands. When they rotate, the artists must keep their markers.
7. The students continue to rotate around in 10-15 second intervals until all the artists in Group B have rotated and have drawn all members of Group A. Each portrait should be developed and quite messy. When the artists arrive back at their original subject, they hand the portrait to that person.
8. The teacher leads a discussion on the outcome of the activity.

Reflection

This activity develops team working as it allows students to work collaboratively to create a portrait of each member of the class. The portraits should be very colourful and visually stimulating and could be displayed on the classroom wall.

B.16 Crocodile River

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

The aim is for the students to physically support each other in a challenge and overcoming 'dangers' to move from one end of a space to another.

30-60 mins

10-40 students

An outdoor space, wooden planks, ropes & stones

Steps

1. The teacher prepares the challenge by putting out the ropes marking the banks of the river. Wooden planks should be piled on one of the banks - there should be as many planks as participants minus one. With groups of 20 or more 2 teams should be created one on each bank of the river crossing in opposite directions.

2. The teacher should assemble all participants on the bank where the planks are. Tell them that they may not yet touch the planks. Explain that they are about to undertake a challenge and that they must listen closely to the instructions.

3. Give the following instructions: "For this challenge you need your problem-solving and collaboration skills. You are a team on an expedition deep in the jungle when suddenly there is a big forest fire. In trying to escape the fire, you have reached a wide river that you must cross with the whole team in order to survive. In the river there are very aggressive crocodiles. Get too close and you're finished. But fortunately you have discovered a set of 'magic stones' lying on the bank. This is the only support you can use in order to cross from one side to the other. The 'magic stones' float on the water as long as there is constant body contact. As soon as body contact is lost it sinks and disappears. If someone puts a hand in the water, the crocodiles will immediately bite it off – the same with feet."

4. The teacher demonstrates that the 'stone' will sink if there is no contact by putting a 'stone' in the water and putting their fingers and foot on the 'stone'. They remove contact and show that the 'stone' will sink. The teacher shows that if a hand or foot touches the ground, it will get bitten off so it must be held behind the back.

5. The group will create a plan and then begin moving across the river. Different groups may take different approaches ranging from highly structured to extremely chaotic. If the group seems to be progressing very quickly with the challenge, then consider introducing the 'oxygen mask' (this could be a roll of tape). Tell the group that the big fire is getting closer and there is a lack of oxygen. All participants both in the water and those standing on the bank need to breathe through the 'oxygen mask' at least every minute. The students must pass the mask constantly, ensuring that each member gets it. This encourages the group to include everyone and get out on the water as a full team. It can also be used as a mechanism to raise the stress level in the group.

6. The teacher should let the group continue until they succeed in getting all members to the other side.   If a member falls into the water, then the group fails and must start from the beginning.

7. Once the group has succeeded at the challenge, the teacher discusses with them how well they worked together.

Reflection

This activity needs an outdoor space (preferably grass), about 15-25 meters long depending on the number of participants (about 1-1.5 meters per participant – if more than 15, count 1 meter and, if less than 15, 1.5 meters) and about 6-8 meters wide.

Materials required: Wooden planks, 1 per participant (about 20x10cm and a thickness of about 2-3 cm – for the 'magic stones'). Two ropes about 6-8 metres long (to mark the banks of the river) A roll of tape, tennis ball or other similar-sized object (to be used as an oxygen mask).

This activity requires students working together creatively and strategically in order to solve a practical or physical problem. It emphasises group communication, cooperation, leadership and membership, patience and problem-solving skills.

Inspiration

Inspired by: https://toolbox.hyperisland.com/crocodile-river

B.17 My Ever Changing Mood

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

The aim is to create awareness of others' feelings towards a learning task.

20 mins   Groups   Whiteboard, Mood Cards, post-its, pen & paper

Steps

1. The teacher presents a learning task to the students.
2. The students are given time to understand and explore their feelings towards the learning task.
3. Each student selects a card that best describes their mood towards the learning task.
4. In groups of 4, each student explains to the rest of the group how they feel.
5. Other members of the group then respond to each participant to explore the others' feelings.
6. A class discussion takes place to analyse the students' responses to the learning task.

Reflection

The activity aims to create group cohesion, collaboration and support by exercising empathy and respect to fellow group members. All students should respond positively to each other using non-judgmental language. It should be stressed during the activity, that moods are everchanging and that nature of the learning task can have a significant impact on one's emotions at one particular time.

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

Inspiration

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

B.18 Positive Presentation

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

The aim is to develop a non-judgemental and co-operative approach to working with others.

30 mins Pairs Whiteboard, post-its & pen

Steps

1. The students should each prepare a 5-minute presentation on a topic of their own choice.
2. Students should pair with other students.
3. The teacher distributes a list of positive comments to each of the pairs.
4. Student A presents their work to Student B.
5. Student B then uses the list of positive comments to feedback to Student A.
6. Student B presents their work to Student A.
7. Student A then uses the list of positive comments to feedback to Student B.
8. The student then re-present and then have their performance reviewed noting any improvements.

Reflection

This activity should create an awareness of others' feelings and responses towards learning tasks. It should concentrate on the importance of effort, praise and a positive use of language towards others e.g. Can we work though a problem together? The activity can also develop a student's sense of becoming socially and visibly confident.

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

B.19 Grandma, Lion, Samurai

Social   *Adapted:* Aleix Barrera, Diego Castro,   *Student Driven*
David Rodriguez-Gomez

The aim is to physically activate the students before the creative process.

20-30 mins   15 students   Whiteboard

Steps

1. The teacher explains the game 'Grandma, Lion and Samurai':
   - the students should use hand gestures and noises mimicking a grandmother, a lion or a samurai.
   - the grandmother points their finger and scolds the samurai
   - the samurai raises their blade and beheads the lion
   - the lion's roar scares the grandmother.
2. The students form two groups. Each group should select their 'champion' who then opposes the other team's champion.
3. Champions are selected in round 'robin fashion' so that each group member has their turn. (Gumula, 2020, p. 100).

Reflection

This activity is played like Rock, Paper, Scissors but use Granma, Lion, Samurai instead.

The activity could be done using online tools such as breakout rooms in Teams/Zoom.

Inspiration

Inspired by: Gumula, J. (2020). Creativity training in organizations: a ready-to-implement concept.

Gruppe. Interaktion. Organisation. Zeitschrift für Angewandte Organisationspsychologie (GIO), 51,95-102.

C. Physical
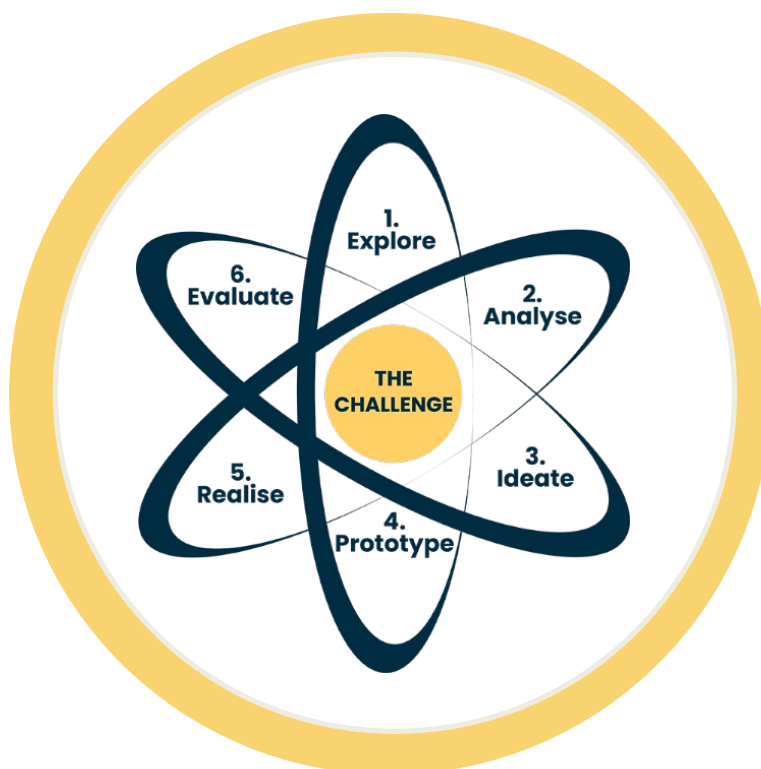
The Physical Learnings Sphere includes the physical environment into the learning process to strengthen the students' awareness of the physical environment in relation to their learning. The focus on the physical learning sphere and the development of the physical learning environment supports the students' ownership and can be described as the 'third educator'. Experimenting with the design of the physical sphere by moving away from the traditional classroom design with "long rows and tables and chairs" also affects the mental and social learning spheres. The students then realise that the new design demands that they move beyond the traditional lessons, to one that supports working in innovative ways other than simply listening to monologues by the lecturer and presentations of subject knowledge. The students have typically formed an idea of the appearance and functions of a physical learning sphere based on their experience of previous study, learning and educational contexts.

One of the methods for creating flexible learning in the partners' experience is to let the students become co-creators of their own learning environment. It encourages student ownership of the learning environment and creates ideal conditions so they can venture on their innovation journey through the six elements of innovation.

C.1 The Physical Sphere

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

The aim is for students to work together to develop a physical environment as an area for creative, innovative and entrepreneurial learning.

1-2 hours   16 students   Whiteboard, classroom & classroom materials

Steps

1. The teacher states that the students should create a classroom that encourages creativity and innovation. The students should consider the following:
   - The purpose of the activity
   - The purpose of subsequent lessons
   - Areas for idea generation
   - Spaces for group work, whiteboard-centred lessons, etc.
2. The students have 30-60 minutes to set up a classroom which supports the purpose of creative learning and innovation incorporating their ideas for the design of the room.
3. The teacher may wish to leave the room whilst the students set up the classroom or remain to participate in the process.
4. The teacher and the students discuss the outcomes of the activity – the roles they took, the group dynamics and how the learning environment will support their creative and innovative learning.

Reflection

This activity will develop teambuilding and role allocation skills. The duration of this activity can vary from half an hour or 3 weeks depending on how radical the students want it to be. There are a variety of issues to consider - the material budget, the roles of the school caretaker and cleaning staff. The teacher may include lessons on the different learning styles to make sure that the classroom is set up to meet the needs of the students. A basic version of this activity could use just the furniture in the room i.e. chairs, tables and its materials. A more challenging one could involve a complete redesign of the classroom in which the students acquire materials by fundraising.

C.2 Station to Station

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

The aim is to develop independent learning skills with different types of resources.

1 hour	Class group	Whiteboard, digital/paper resources, tablets pen & paper

Steps

1. The teacher places resources about a topic at 'stations' around the room.
2. The students go round each station collecting information on the topic:
   - what it is about?
   - interesting facts
3. Students post their research findings on post-its, whiteboard or Padlet.
4. The class reviews the information and group the information together on the whiteboard/Padlet.

On completion of this exercise, the students may, now, progress to the next activity.

Reflection

This activity will increase the students' abilities to become independent learners and increase task-motivation as the physical element will make the activity more dynamic. It reinforces the need for different sources of information in the learning process.

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

C.3 Creating an Ideal Learning Space

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

The aim is to raise awareness of the importance of the learning environment and its impact on learning.

30 mins

Groups of 4

Whiteboard, poster paper, digital resources, craft materials, post-its & pen

Steps

1. The teacher places a range of materials around the room for students to use.
2. The students are to produce a written/visual presentation or create a physical model for a challenge using any resources found around the classroom. Students should feel free to move tables around to help them complete their challenge. The teacher will help the students to identify a suitable challenge.
3. Students organise themselves into groups of 4.
4. The groups move about the room gathering information for their presentation/model.
5. The students move around the room collecting resources.
6. The groups create their presentation/product.
7. The groups present to the class.
8. The groups reflect on the activity and note on post-its the different way they used the room during different stages of the activity.
9. The post-its are placed on a wall under the headings Planning, Gathering and Presenting for the class to review.

Reflection

This activity will raise student's awareness of how best to use the room space at different parts of the activity. They should have the opportunity to move around and reorganise the room as they wish - they could also use an outdoor space for resources. The dynamic nature of the activity will stimulate engagement, motivation and innovation. It gives students full responsibility and control over their learning space and maximises creativity as students will have a wide range of resources to work from.

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

Atom Activities
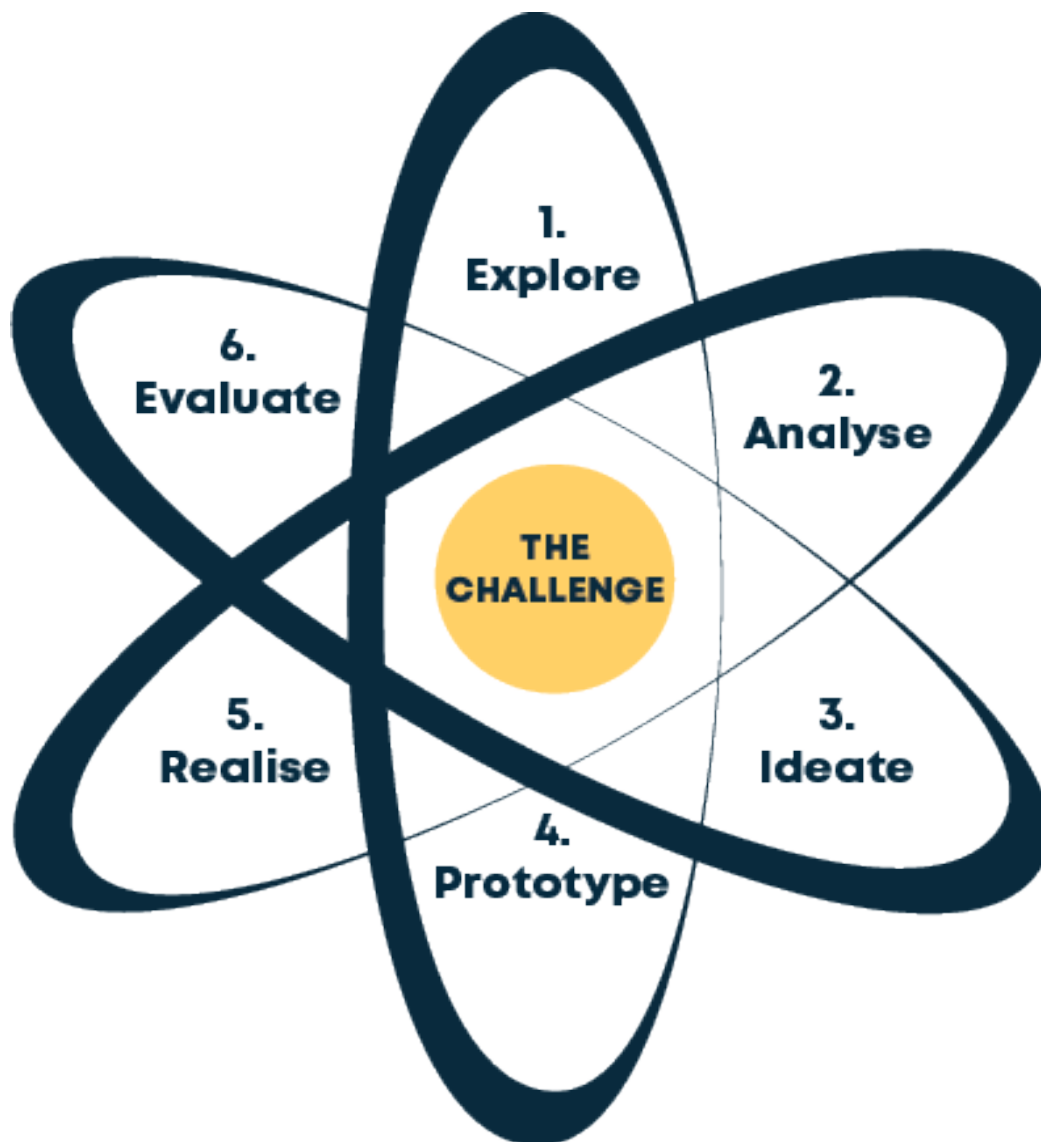
THE

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.

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 mins   Groups of 2-5   Whiteboard, pen, paper & post-its

Steps

1. The teacher draws 6 boxes – one below the other – on the whiteboard and explains the use of the 5 Whys.
2. The students, or the teacher, define a problem with a product and create a draft statement for the challenge.
3. 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?'
4. The groups answer the question and write it as a 'Why' question.
5. The students repeat the process 5 times to reach the reason for the problem in the challenge.
6. 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.

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

Inspiration

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

0.2 5 Ws&1H – Who? – What? – When? – Why? – Where? – How?

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

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

10-20 mins   **Groups of 2-5**   **Whiteboard, pen, paper & post-its**

Steps

1. The teacher creates 6 boxes on the whiteboard. Each box should contain one of the 6 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?
    *   HOW does the product work, how will it look and how much will it cost?

2. The students review the questions and put their answers in each of the boxes.
3. The group reviews the answers and identifies key information for the challenge.

Reflection

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

Inspiration

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

0.3 Scamper

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

The aim is to develop the skills to create solutions for the challenge.

30-60 mins   Groups 5-10   Whiteboard, pen & post-its

Steps

1. The teacher and the students define a problem with a product, process or an idea that they want to improve on - something they are having problems with or something that is strategically a good starting point for the challenge.
2. The students must ask as many questions and give as many answers as possible about the idea, service or product identified using SCAMPER (Substitute, Combine, Adapt, Modify, put to another use, Eliminate and Reverse) as a guide.
3. Students form groups and ask each other the SCAMPER questions about the challenge.
4. The groups note all the answers and write them down on post-its and place them on the wall.
5. All groups review the Post-its and assess their viability in solving the problem.

Reflection

Prompts for SCAMPER questions:
Are there Substitute solutions? Can we Combine any existing solutions? Can we Adapt any existing solutions? What areas can we Modify? What other solutions can we Put to another use? What processes can we Eliminate? What processes can we Reverse?

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

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

Inspiration

Inspired by: R.F. Eberle 1972). Developing Imagination Through Scamper. The Journal of Creative Behavior, 6(3), 199–203. https://doi.org/10.1002/j.2162-6057.1972.tb00929.x

Inspired by Mind Tool (https://www.mindtools.com/pages/article/newCT_02.htm)

0.4 Institutional History

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

The aim is to identify historical issues that have impacted on the performance of an organization.

30-60 mins	All members of the organisation	Computer, questionnaires, mobile &pen

Steps

1. The teacher writes the aim on the board and outlines the three phases of the activity relating to the performance of a company.
2. Members of the organisation complete the 3 phases of the activity:
   - Phase 1: Participants are asked to complete a questionnaire rating a specific aspect of the organisation from 1-5 over the last 5 to 10 years. The aspect could be about the working environment, performance or job satisfaction within the organisation.
   - Phase 2: The moderator collects the information and identifies the years with the lowest and the highest ratings for all aspects.
   - Phase 3: Small groups from all the departments assess the factors that have contributed to the ratings in the specified years.
3. Small groups from all departments discuss and assess the factors and propose solutions for implementation.

Reflection

Phase 3 could be developed through communities of practice, thought showering or a nominal group. The activity could be done using online tools such as Padlet, Miro, Mural, virtual whiteboard and breakout rooms in Teams/Zoom.

Inspiration

Inspired by: Gairín, J., & Armengol, C. (1996). La Jefatura de estudios. Estrategias de actuación.

Curso   de formación para equipos directivos. Madrid: Ministerio de Educación. Available from https://ddd.uab.cat/record/128697

0.5 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 minutes   Participants 5-30   Whiteboard, timer, pen, paper & post-its

Steps

1. The teacher and students create a challenge that must be:
   - concrete so that it is manageable to allow ideas to be generated for solutions.
   - in the form of an openended statement /question to allow it to be explored.
   - in a format that enables students or external collaborators to realise or act on in the future.
2. The teacher asks the students to write down the following three questions to which they should refer to throughout the activity:
   - How do I/we/the organisation create ...?
   - How do I/we/the organisation get …?
   - How do I/we/the organisation develop … ?
3. The students start by working in their project groups to formulate a challenge e.g. How do we create …?
4. The groups are paired together and present their ideas to each other. They give feedback to each other focusing on the 3 criteria above.
5. The students reflect on the feedback and thoughtshower to create their challenge.

Reflection

It is essential to have a clear formulation of the challenge in the core of the 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.

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

0.6 Find your Challenge

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

The aim is to identify the challenge

| 10-20 minutes | Groups 2-30 | Whiteboard, pen, paper & post-its |

Steps

1. The students pair up with someone who has the same shoe size as them.
2. The students ask each other questions about challenges in their lives e.g.
   - Things that they find annoying
   - Getting up in the morning
   - Finding every item - socks, mobile etc.

3. Students take it in turns to ask each other questions about things they find annoying. Students should take note of all their answers.
4. The students change partners and repeat the exercise again taking note of all their answers.
5. The students review all their answers and write down the 3 things they find must annoying on a post-it and place all their comments on the post-it wall.
6. The students review the comments and find the one thing they would be most happy find a solution to.
7. 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.

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

0.7 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 | Class or group 1-2 | Whiteboard, computer, pen, paper & post-its |

Steps

1. Suggestions for a challenge could come from any of the following – this list is not exhaustive:
   - An external organisation which wants to collaborate with students on a challenge from https://www.foremlink.com/challenges
   - 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.
2. The project group 'thought shower' their ideas for a challenge and write them on posit-its and place them on the wall. They group any similar challenges together.
3. The project group then consider possible skills and limitations that they have. They should write each one on a separate post-it and place it beside the appropriate challenge suggestion on the wall. The teacher explains that the challenge should be substantive and follow the criteria for selecting a challenge (Focusing on the Challenge Formation).
4. The students write the criteria on separate post-its and then discuss where they should be placed on the wall.
5. The students should then be able to clearly identify a substantive challenge.

Reflection

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

0.8 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.

2-3 hours   Groups 2   Whiteboard, A2 paper, pen, paper & post-its

Steps

1. The students identify ideas for challenges and write these on the post-it notes and place them on the left-hand side of the whiteboard. The students read aloud each others' post-its from the whiteboard.
2. The students categorise the post-its and place them together on the right-hand side of the whiteboard. They then create appropriate headings for each of the groupings on A2 paper.
3. The students place the post-its under the appropriate heading on sheets of A2 paper.
4. The students move around the room from one A2 sheet to another - 'Shopping for ideas' - discussing the post-its with other students using a "Yes and ..." strategy to develop their thinking about the challenges.   (This stage should take approx. 30 minutes).
5. 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.
6. Students write their chosen challenge on a post-it and place it under a challenge heading on the whiteboard. 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.

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

0.9 The Marketplace

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

The aim of this activity is to gather the views of external customers for students to assess the viability of their business ideas.

1 Day　　　　　　Participants 50 - 250　　　　　Materials for event making

Steps

1. The students are to create 2 versions of the business fair for enterprise:
   - A small invitation event for family and friends
   - A larger event that is open to family, friends, colleagues and external customers
2. Students create prototypes for their product which will be launched at the events. These prototypes are evaluated by members of the group with suggestions feedback to the design team to improve the product or service.
3. The teachers and students choose a name, date, timing and location for the event. The teacher appoints a marketing team for the events.
4. The marketing group develop materials for the event - leaflets, posters and signage. A questionnaire is created to gather the views of attendees. The marketing group identify customers to attend at Event 2 and send out invitations and erect stands and tables for the event.
5. The students prepare their own marketing material and prepare presentations for their product.
6. At the end of the event, each group of students review the questionnaires and assess the impact of the feedback on the development of their business using the following questions:
   - Were the visitors interested in the products?
   - Was the price of the product at the correct level?
   - Did the visitors understand the problem that the product was trying to solve?
   - Were the presentations affective?
7. The students collate all the feedback and then discuss the viability of their business ideas.

Reflection

The activity illustrates how the teacher could assist the students in preparing the marketing of their products (prototypes) and services, etc. The business fair for entrepreneurs is primarily directed at students who have worked with a challenge that involves economic innovation which explores the commercial use of an idea.

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 presense 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.

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 minutes   Groups 2-40   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 complete the interviews using the interview guide.
4. The students analyse the interviews and identify the relevant information for the challenge and post it on the whiteboard.
5. The teacher aids the students in reviewing the challenge and discussing what knowledge they have acquired from the interviews.
6. The students then decide whether or not 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.

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

1.2 Observe the Challenge

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

The aim is to help the students develop their observational skills

2hrs–2 days	Groups 2-40	Whiteboard, mobile, pen & post-its

Steps

1. The students select who/what is relevant to observe in relation to their specific challenge and agree on a time and place to carry out an observation. It is essential that they draw up a clear contract between themselves and any individuals or groups who will be observed.
2. The students decide on the focus of their proposed observations and how they will document the data they gather. The observation is then carried out.
3. Data from the observation is analysed with the relevant points for the challenge being selected.
4. The data is displayed next to the challenge to allow the students to incorporate potential solutions for the challenge - this may lead to adjustments to the formulation of the challenge.
5. The teacher helps the students in reviewing the challenge and discusses what knowledge the students have acquired that helped them learn more about the challenge. For example, does it suggest new perspectives or should they adjust the challenge formulation?
6. Relevant data in relation to understanding the challenge is incorporated into the idea generation of a suggested innovative and meaningful solution.

Reflection

The area for the activity could be an everyday life event, the application of a product, a workflow or an individual within a target group. The observation contract ensures that all parties agree to and understand relevant data from the observations. Students should choose the most appropriate method for their challenge observations - either qualitative or quantitative methods. Observation creates perspectives which will be analysed by the students which may lead to the discovery of new information to create credible and valued solutions to the challenge.

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

Inspiration

Inspired by: Steinar Kvale, Otto Scharmer. Adapted to this format by Anni Stavnskær
Watch the development of a shopping cart by observation and experimentation:
https://youtu.be/M66ZU2PCIcM

1.3 Thinking Hats Full Picture

Explore *Adapted: Patricia Huion* *Facilitated by the Teacher*

The aim is to create a multi-perspective definition of the challenge.

1 week

6 groups

Whiteboard, computer, pen,
Padlet, paper & post-its

Steps

1. Students are organised into 6 groups. To start with, the teacher gives each group one Hat. During the activity the students will use each of the 6 Hats.
2. Each group goes through the 6 stages below, taking notes on Post-its:
   - **Stage 1** - White Hat: Gather information, facts and data for the challenge and anlayse it.
   - **Stage 2** - Red Hat: Use your emotions and think about problems that might arise. Think about how the clients feel.
   - **Stage 3** - Yellow Hat: Think positively. Focus on the positive aspects and possibilities of the solutions.
   - **Stage 4** - Black Hat: Think about possible faults and weaknesses of the solutions.
   - **Stage 5** - Green Hat: Create innovative solutions to the challenge.
   - **Stage 6** - Blue Hat: Create a step-by-step plan to show how processes should be organised, identify any problems and refer back to Green or Black Hat thinking if required.
3. Groups post their notes on the whiteboard under the 6 Hats headings and identify any trends.
4. Groups review all the post-its and discuss how they could define the challenge.

Reflection

Additional help on using the Six Hats can be found at: http://www.ideasforideas.com/

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

Inspiration

Inspired by: De Bono, E. (1985)
Six Thinking Hats   Little Brown: Boston

1.4 What? How? Why?

Explore   *Adapted: Patricia Huion*   *Facilitated by the Teacher*

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

2-3 hours

15 students

Whiteboard, A2 sheets, pen, paper & post-its & post-its

Steps

1. The teacher writes '**What? How? Why?** on 3 separate sheets of A2 paper.
2. The '**What?**' stage - students:
   - gather information for the challenge e.g. requests from the client
   - identify other people involved in the challenge and their roles.
   - collect pictures of the challenge.
3. The students place all the collected information under the '**What?**' heading.
4. The '**How**?' stage - Students show clients the pictures of the challenge taking notes on the following reactions of the clients to the pictures:
   - Are they nervous?
   - Are their reactions rushed or do they hesitate?
   - Do they like or dislike them?
5. The students place all the collected information under the '**How**? heading.
6. The '**Why?**' stage - Students put themselves in the role of clients and ask themselves the following questions about the reaction of the clients to the challenge:
   - Why did they react the way they did?
   - What was their motivation for their reaction?
7. The students place all the collected information under the '**Why**? heading.
8. Students review the A2 sheets and check their findings with the clients and note any new insights that they have discovered.

Reflection

Students can choose to role-play or to actually interview the client, or they can use different target groups to gather different opinions about the challenge.

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

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/

1.5 5 Ws&1H – Who? – What? – When? – Why? – Where? – How?

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

The aim is to identify key information for the challenge to develop a clear overview of the challenge.

10-20 mins   Groups of 2-5   Whiteboard, pen, & post-its

Steps

1. The teacher then creates 6 boxes on the 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 challenge, who is it meant for and who will make decisions ?
    - **WHAT** do you want to achieve, what do the customers want, what is the context and what is the purpose?
    - **WHEN** does the challenge start, 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?
    - **HOW** does the product work, how will it look and how much will it cost?

2. The groups review the questions and put their answers in each of the boxes.
3. All the students analyse the answers and discuss whether they add clarity to the challenge.

Reflection

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

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

Inspiration

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

1.6 Nominal Group Technique

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

The aim is to identify problems, causes and solutions of the challenge.

30-60 mins   Groups of 5-30   Whiteboard, pen, paper & post-its

Steps

1. The teacher writes 3 question headings on the whiteboard for each group to answer on post-its:
   - What are the 3 main problems of the challenge?
   - What are the 3 main causes of the challenge?
   - What are the 3 main solutions to the challenge?
2. Students place post-its under the headings on the whiteboard.
3. The groups review all the post-its whilst thinking about the 3 questions above.
4. The groups then thought-shower and select the best solution for the problem.

Reflection

Although this activity allows students to select the most suitable solution, they should be open-minded about other possible solutions from the ideate stage.
Additional help on using Nominal Group Technique can be found at: http://www.ideasforideas.com/
The activity could be done using online tools such as Padlet, virtual whiteboard and breakout rooms in Teams/Zoom.

1.7 Post-it Parade

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

The aim is to generate information about the client's company.

2 hours   **Project group**   **Whiteboard, computer, pen & post-its**

Steps

1. The teacher writes the following headings on the whiteboard for students to research:
   - The client's profile
   - The target group for the prototype
2. The students, individually, conduct their research and write their information on Post-its.
3. The students post their comments on the whiteboard under the appropriate headings.
4. The project group reviews all the Post-its and groups similar information to identify key points for the challenge.

Reflection

This activity creates a base from which to progress on to the 'Analyse' stage and offers the opportunity for students to correlate and cross check valid information from different sources.

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

Inspiration

Inspired by: The Centre for Teaching and Learning
https://teaching.uwo.ca/teaching/learning/active-learning.html

1.8 Quescussion Exploration

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

The aim is to identify relevant areas of examination for a set challenge.

1 hour | Class | Whiteboard, pens & post-its

Steps

1. The teacher writes a statement/question on the whiteboard e.g. "The most important element in this task is that you know your target audience."
2. Students then shout out their own question relating to the initial question/statement.
3. They need to wait for others to finish before they can contribute again.
4. If a student makes a statement, the rest of the class should shout '**STATEMENT!**' The comment should then be withdrawn.
5. The teacher writes all the questions on the whiteboard.
6. Small groups should then be created to review the questions identifying any possible trends in the responses.
7. A class discussion should then take place to reach a consensus and create a plan/route map for the challenge.

Reflection

The wide-ranging nature of this activity allows the students to take emotional risks and develop innovative thinking in asking 'left of field' questions.

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

Inspiration

Inspired by: Thomas Armstrong (2019)

http://www.ascd.org/publications/educational-leadership/may19/vol76/num08/Honoring-the-Teen-Brain@-A-Conversation-with-Thomas-Armstrong.aspx?utm_source=twitter&utm_campaign=Social-Organic&utm_medium=social

1.9 Idea Speed Dating

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

The aim is to formulate challenge.

40 mins   6 students   Whiteboard, pen, paper & post-its

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Steps

1. The students research information on the client:
   - The client's profile
   - The target group for the prototype
   - Possible resources/materials
2. 5 Students sit at different tables placed around the room.
3. The other student rotates around the tables exchanging information from their research with the 5 students on a one-to-one basis. They should spend 5 minutes with each student before moving on to the next desk. This continues until the student has spoken to all 5 students.
4. The students then reflect on the activity and collate their information on the whiteboard.
5. The information gathered is then used in the 'Analyse' section in meeting the challenge.

Reflection

This activity can help more introverted students flourish and lessen the impact that dominant students often have in all-class discussions. It can also help others to understand wider class dynamics and to share and identify key information about the client.   It also shows that each student can do more with the help of someone else than they can do on their own (Vygotsky, 1978).

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

Inspiration

Inspired by: Muurlink & Matas, 2011

https://ablconnect.harvard.edu/speed-dating-research

1.10 Station to Station

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

The aim is to formulate the challenge.

20 mins   Project group   Whiteboard, learning resources pen & paper

Steps

1. The teacher places resources about the company at 'stations' around the room.
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 post-its, 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 realise phases of the projects.

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

1.11 My Ever Changing Mood

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

The aim is to explore students' feelings towards challenges.

20 mins   Project group   Whiteboard, Mood Cards, set of challenges, post-its, pen & paper

Steps

1. Each challenge option should be presented one at a time to the students.
2. The students are asked to select a mood card that best highlights their mood towards a challenge.
3. The students write their reaction to each challenge – anonymously - on a post-it/Padlet.
4. This process should be repeated with the remaining challenges.
5. The teacher collates all the post-its and Padlet comments for each challenge.
6. A discussion then takes place to analyse the students' responses to each challenge.
7. 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 nature of the learning task can have a significant impact on one's emotions at one particular time.

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

Inspiration

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

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 as 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.

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 mins   Even number of students   Whiteboard, Padlet, pen & post-its

Steps

1. The students, or the teacher, define a problem with a product and create a draft statement for the challenge.
2. 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?'
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.

Reflection

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

Inspiration

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

2.2 Pixar Pitch

Analyse   *Adapted: Patricia Huion*   *Facilitated by the Teacher*

The aim is to create a pitch that lingers on in listener's ears.

30-60 mins   Groups of 15   Whiteboard, computer, pen & post-its

Steps

1. The teacher introduces the template for the Pixar Pitch for the students to fill in:
   - Sell your question in a Pixar Pitch
   - Once upon a time ---------- (scene)
   - Every day ---------- (routine)
   - One day ---------- (the challenge)
   - Because of that, ---------- (consequence 1)
   - Because of that, ----------(consequence/ action 2)
   - Until finally ---------- (desired result)
2. Students complete template and prepare for the pitch.
3. The students should be given 20 mins to create the pitch and 10 mins to present it.

Reflection

Finding Nemo is the prototypical pixar pitch. It can be found at: https://creativite-consultants.com/2019/05/30/the-pixar-pitch-story-selling-at-its-best/

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

Inspiration

Inspired by: https://creativite-consultants.com/2019/05/30/the-pixar-pitch-story-selling-at-its-best/

Pink, H.D. (2013). To Sell Is Human. The Surprising Truth about Persuading, Convincing, and Influencing Others. USA: Canongate

2.3 5 Ws&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 mins   Groups 2-5   Whiteboard, pen, paper & post-its

Steps

1. The teacher then creates 6 boxes on the 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?
2. The groups review the questions and put their answers in each of the boxes.
3. 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.

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

Inspiration

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

2.4 The 5 Boxes

Analyse   *Adapted: Patricia Huion*   *Facilitated by the Teacher*

The aim is to identify the problems behind a challenge and to create a targeted solution for it.

20-30 mins   An even number of students   Padlet, pen & post-its

Steps

1. The students, or the teacher, define a problem with a product, process or an idea. The students use The Five Boxes to create a solution to the problem. The teacher draws 5 boxes on the whiteboard – one below another.
2. The teacher explains the 5 Boxes to the class and creates 5 boxes on the whiteboard. The teacher puts the students into pairs - A and B.
3. The students go through the 5 Boxes process:
   o Student A describes the problem to student B
   o Student B asks 'why' to the problem.
   o Student A writes the answer in the first box.
   o This process is done 5 times with each answer refining the cause of the problem.
4. All the students review all the answers to the 'Why' questions and then decide the best solution that will solve the challenge.
5. Students explain their solutions to the rest of the class.

Reflection

This activity forces students to examine and express the underlying reasons for their behaviour and attitudes. This can help them to discover the hidden problems that need solving by reformulating the question.

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

Inspiration

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

2.5 Appreciative Inquiry

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

The aim is to identify what works well in an organization and enhance it.

1-2 hours   Groups 5-10   Whiteboard, computer, pen & post-its

Steps

1. The teacher writes 4 phases on the whiteboard that students will use in the activity:
    - **Discover** – what works well?
    - **Dream** – imagine what might be
    - **Design** – plan what might be
    - **Destiny** – creating what can be
2. **DISCOVER**: The groups conduct structured interviews with stakeholders to ask what works well in their organisation.
3. **DREAM:** Groups review the results from the interviews and select examples of best practice. The students, in discussion with the clients, create a statement of what would work well in an organisation of the future. This statement should be posted on the whiteboard.
4. **DESIGN:** Groups review the statement and, with the organisation, plan to implement the 'Dream' changes
5. **DESTINY:** Groups decide roles and responsibilities and implement the changes to the organisation. Groups review the changes to organisational processes and feedback to stakeholders. This will generate new appreciative inquiries which will restart the DISCOVER cycle 'What can be'.

Reflection

Appreciative Inquiry is an Organizational Development strategy that identifies what works well within an organisation and uses this to develop the organisation.   For the DESIGN phase strategies such as innovation canvas could be used here.

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

Inspiration

Inspired by: Cooperrider, D. L., Sorensen, P. F., Yaeger, T. F., & Whitney, D. (Eds.). (2001).

Appreciative inquiry: An emerging direction for organization development. Champaign, IL: Stipes

2.6 Rose, Bud and Thorn

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

The aim is for the students to identify the positive, the negative and the unexplored areas of the challenge.

30-60 mins   Students 5-10   Whiteboard, pen & post-its

The teacher distributes coloured post-its to the students that represent the following:

- Red – **Rose**   Green – **Bud**   Blue – **Thorn**

Steps

1. The Students reflect on their challenge experiences and make notes on the appropriate coloured post-its.
   a) **ROSE** - Students reflect on the positive experiences and write their answers on red post-its. They could think about the following:
      - What was the highlight of your experience?
      - Describe efforts that blossomed.
      - Explain have you been successful?
   b) **BUD** - Students reflect on the unexplored areas and write their answers on green post-its. They could think about the following:
      - What are you looking forward to tomorrow?
      - Describe opportunities that energize you.
   c) **THORN** - Students reflect on the negative experiences and write their answers on blue post-its. They could think about the following:
      - What went wrong during your day?
      - What was the most stressful part?
      - Identify anything that caused difficulty.
2. Students place all their post-its on the whiteboard.
3. The teacher uses the Affinity Diagram (or Affinity Mapping) strategy to group the post-its to identify the positive, promising and problematic areas of the challenge.
4. The students reflect on the Affinity Diagram's findings and identify key trends from their experience.

Reflection

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

Inspiration

Inspired by: Atomic Object (https://spin.atomicobject.com/2018/04/03/design-thinking-rose-bud-thorn/).

2.7 Solution Slam

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

The aim is to select the main areas for development in the challenge.

1 hour   Class   Whiteboard, pen & Post-it Parade

Steps

6. The class review all the information from the Explore Post-it Parade phase to get an overview of the research results.
7. Students form groups of 3 to 4.
8. One student tells the rest of their group all they can remember from the Post-it Parade. They should do this in 30 seconds and from memory and not from notes.
9. The other group members take notes from the presentations – this will reinforce the essential pieces of information from the Explore phase.
10. The group review all their notes and collate them into a single sheet.
11. One student from each group should group together any similar points on the Post-it Parade.
12. The students create headings for each group and write down the main areas for development in the challenge.

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Reflection

As students are thinking on their feet within a tight timescale, it is hoped that the most significant solutions are identified by the groups. Teenage students may benefit greatly from this type of activity as it allows them to take more emotional risks in their thinking.
This activity could also be used when selecting a challenge.

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

Inspiration

Inspired by: Thomas Armstrong (2019)
http://www.ascd.org/publications/educational-leadership/may19/vol76/num08/Honoring-the-Teen-Brain@-A-Conversation-with-Thomas-armstrong.aspx?utm_source=twitter&utm_campaign=Social-Organic&utm_medium=social

2.8 Application Cards

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

The aim is to develop the skills to identify relevant pieces of information.

30-60 mins   Groups 4-5   Whiteboard, pen, paper, card & post-its

Steps

1. The students form groups of 4-5.
2. The teacher creates cards each with one heading from the Post-it Parade Explore stage on it and gives one to each group. The groups form a circle.
3. The card is passed around the circle with each student writing down at least one way in which the heading on their card be can be applied to the challenge.
4. When all the students have added comments to their card, they are then placed on the 'idea wall' for all the students to view.
5. A class discussion should then take place which identifies the key ways that all the headings can be applied to the challenge.
6. Students should then create a diagram clearly showing how all the ideas are applied to the challenge.
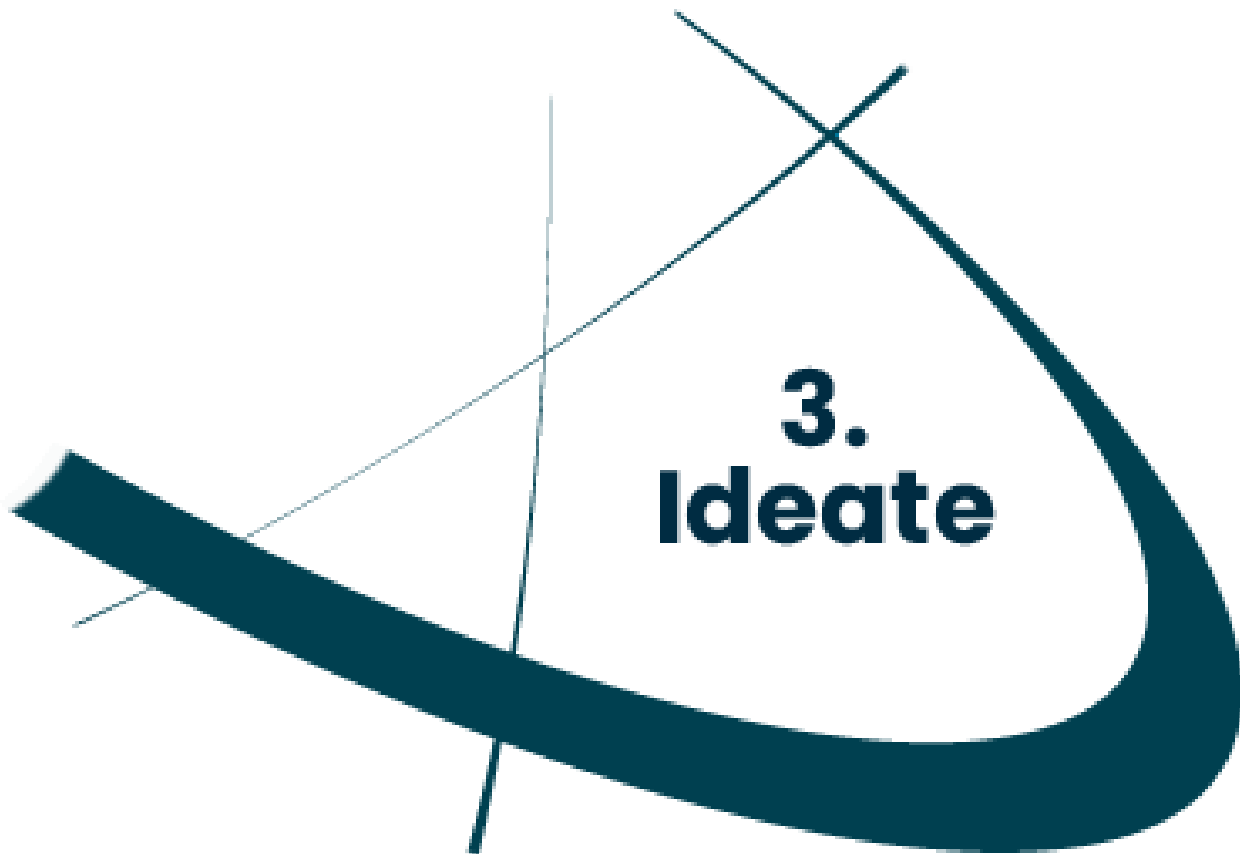
Reflection

This activity should build on the information gathered during the Explore stage and will allow students to learn from others in the group and build on their ideas. This will create a group consensus about the information.

Students' understanding of the task will improve as they will be engaged in pairing research work to the challenge, and will allow for the creation and gathering of innovative ideas/insight about the task e.g. client/target audience.

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

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 particular 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.

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 mins   Students 5-10   Whiteboard, pen & paper

Steps

1. The teacher outlines the task to the students:
   - As Polman and Emich (2011) state, decisions made by others are more creative than decisions made by ourselves.
   - 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.
2. The students should choose any superhero, comic character, celebrity, scientists, famous athlete etc.
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 their issue, problem or task,
5. The teacher discusses this approach to solving problems with the students.

Reflection

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

Inspiration

Inspired by: Gumula, J. (2020). Creativity training in organizations: a ready-to-implement concept. Gruppe. Interaktion. Organisation. Zeitschrift für Angewandte Organisationspsychologie (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

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93

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	Participants 5-10	Whiteboard, pen, paper & post-its

Steps

1. The teacher explains 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 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 organise and visualise all the ideas of their user journey map - they can draw it or use post-it notes. (10 mins)
6. The facilitator should spend 10 minutes at the end to share and reflect on the different maps.

Reflection

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

Inspiration

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

3.3 Thinking Hats as Metacommunication

Ideate   *Adapted: Patricia Huion*   *Facilitated by the Teacher*

The aim is to equip students with conversation 'de-blocking' responses.

30-60 mins	Max of 30 students	6 different coloured hats

Steps

1. The teacher explains the use of the 6 Hats and puts the thinking Hats (black, white, blue, red, green and yellow) in a prominent place around the room.
   - The teacher could refer to https://iqdoodle.com/six-thinking-hats/
2. The students select a problem that needs to be addressed (e.g. The challenges faced by an international entrepreneur by a one week digital lock down in the Asian countries where their production factories are situated – the challenge should be as detailed as possible.
3. One of the students volunteers and selects the BLUE HAT.
4. One of the students volunteers and selects the BLACK HAT.
5. The rest of the students select a coloured Hat.
6. The teacher explains the game which should last for 25 mins:
   - The student with the BLUE Hat starts clapping and shouts out when they think the students should change hats. All the students should clap to reinforce the rhythm.
   - The BLUE Hat shouts out a colour of one of the Hats. The student with this Hat shouts a solution to the problem. Each time the group claps the neighbour on the left continues within the same colour e.g. GREEN GREEN GREEN.
   - The BLUE HAT then shouts out another Hat colour who gives a solution to the problem. Each time the group claps the neighbour on the left continues within the same colour e.g. RED RED RED.
   - This is repeated for the WHITE and YELLOW Hats.
7. The Student with the BLACK Hat stops the circle if they hear a solution that does not belong to that Hat colour (e.g. When a White Hat says "'I write an email to my contact person voicing my concern". When this happens, the circle starts all-over again. When all the Hats have given solutions, the BLUE Hat challenges the BLACK Hat by stating the problems the international entrepreneur faces, what the international entrepreneur wants to achieve and how the international entrepreneur may solve the problem.
8. The BLACK HAT points out the flaws and weaknesses in the solution and why it is likely to fail.
9. The game ends with a round of applause for the participants

Reflection

For this activity, it is essential for all the students to understand how the Thinking Hats approach works. This will make the activity more fun for them. Additional help on using the Six Hats can be found at: http://www.ideasforideas.com/

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

Inspiration

Inspired by: https://iqdoodle.com/six-thinking-hat

3.4 Hatty Me

Ideate   *Author: Patricia Huion*   *Facilitated by the Teacher*

The aim is to become aware of your default hat and have the choice to adapt when necessary.

30 mins per day x 7 days

One student

Whiteboard, crayons, pen & paper

Steps

1. Each student should buy a 'paper blanc' i.e. a writing journal.
2. Each day, the student should choose a conversation, discussion or debate and write down their arguments and colour-code them using the categories of the Thinking Hats of de Bono.
3. At the end of the month, the students should review their arguments and choose which Hat colour has been the easiest one for them and which one has been the hardest.
4. Students draw a picture of themselves and draw hats on it - like a magician to visualise Step 3. They can use different sizes of text and colours to define their favourite interaction style.

Reflection

The students could share their work with each other as this could help them to complete the activity. For example, it may help some students with parts of the activity that they struggled.

Additional help on using the Six Hats can be found at: http://www.ideasforideas.com/

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

3.5 Conceptual Blending

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

The aim is to create innovative ideas by making combinations.

20-30 mins   Groups of 2-5   Whiteboard, pen, paper & post-its

Steps

1. The students write down the key word of the challenge in the middle of a piece of paper.
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.
4. The students pick 2 words out of their 'word cloud' and combine them into 1 idea.
5. The students make a 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.

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

Inspiration

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

3.6 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 mins   Groups of 2-5   Whiteboard, pen, paper & post-its

Steps

1. The challenge is written on the 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 than better instead of finding a solution for it?
4. The students write their ideas on paper or post-its.
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 groups.

Reflection

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

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

Inspiration

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

3.7 Sticky Dots

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

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

| 5-10 mins | Groups of 2-10 | Whiteboard, sticky dots, pens & post-its |

Steps

1. The students thought-shower their ideas for the challenge and write them on the whiteboard. They should give a short explanation of each idea they suggest.
2. All students are given 3 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.
3. After 5 minutes, all the dots on each idea are counted and the one with the most dots is the winner.
4. The students then form groups to debate why one idea was selected over the others and explain why this one was chosen.

Reflection

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

3.8 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 mins   Groups of 9-30   Whiteboard, pens & post-its

Steps

1. The teacher outlines the task to the students.
   - 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.
   - The teacher should display the image of a pressure cooker around the room so the students are constantly reminded of the pressure to generate with ideas and thoughts quickly.
2. The teacher gives small tasks to the groups. All the tasks will generate answers to the same key question set by the teacher.
3. The students are given limited amounts of time to generate answers to the tasks.
4. Students can also change groups to increase the pressure.
5. The students then come together and share their conclusions with all the groups.
6. 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.

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

3.9 Use the Word

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

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

10–20 mins   Groups 2-40   Whiteboard, pen & Word cards

Steps

1. The teacher demonstrates the task to the students and shows them how to use the word cards.
2. Each of the students pick one of the word cards.
3. The teacher encourages the students to read the words on the card 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 pick another word from the card.
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 word cards – they can either use the words from the board game "Draw and guess". 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 – similar to divergent thinking - which involves them stepping away from the logical and linear forms of reasoning to search for original and creative solutions to problems.

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

3.10 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 mins　　　　　Groups 5-40　　　　　Whiteboard, pen & post-its

Steps

1. The students are asked to close their eyes and are asked to think of the last person to have made an impression on them - a person they look up to or who inspire them 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 their ideas they thought of during the reflection period.
5. The teacher and students review 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.

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

3.11 Picture Walk

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

The aim is to generate solutions from inspirational pictures.

10-20 mins

Groups 5-30

Whiteboard, picture card, pen & post-its

Steps

1. The teacher places picture cards on the floor around the room.
2. The students are told to find one person that is about the same height as them within their group.
3. The students walk around the room and look at the pictures together and identify solutions to the challenge that are generated from reviewing each picture. They should take a note of all their solutions on post-its. The students should do this for all the pictures.
4. The students should place all their post-its on the whiteboard.
5. The teacher rings a bell to end the activity.
6. The students then review all the post-its on the whiteboard and select the most appropriate solutions.

Reflection

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 usual patterns and will then impulsively accept the first thought(s) that come to mind. This will develop a link between this/these thought(s) and the challenge.

Dialoogle picture cards could be used or some pictures from the computer could be printed and laminated https://dialoogle.com/da/

The activity could be done using online tools such as Padlet, virtual whiteboard and breakout rooms in Teams/Zoom. If working online, click the link to find random pictures to ideate from: https://randomwordgenerator.com/picture.php

3.12 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 mins	Groups 2-40	Whiteboard, picture cards, watch, pen & post-its

Steps

1. The teacher demonstrates how to create an idea for solving the challenge by means of a picture card.
2. The students are given a stack of picture cards each. The cards should be laid face down on the table so that the picture cannot be seen.
3. The students draw a card from their individual stacks and write down the idea(s) the picture evokes in them. They should focus on one 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 drawn when the students cannot get more ideas from their current cards.
5. The class should come together and discuss their ideas.

Reflection

Dialoogle picture cards or some pictures from the computer could be printed and laminated and used as stimuli. Alternatively, post-cards, children's memory game cards or a picture lottery could also be used. If working online, 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. The activity could be done using online tools such as Padlet, virtual whiteboard and breakout rooms in Teams/Zoom.

3.13 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 mins

Groups 2-35

Whiteboard, phone, pen & post-its

Steps

1. The students are asked to imagine that they are eight centimetres 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 post-its.
2. The students place their post-its on the 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 post-its on the 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 on post-its and place them on the 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.

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.

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

Inspiration

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

3.14 Ask a Stranger

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

The aim is to show that random pieces of information may prove useful in developing solutions to the challenges

30-60 mins   Groups 2-35   Whiteboard, phone, pen & post-its

Steps

1. The students are asked to leave the classroom and engage in conversation with a stranger, asking them how they would solve the chosen challenge.
2. The students should take note of:
   - What thoughts the stranger has on the challenge?
   - Any information or possible solutions that the stranger may have for the challenge.
3. The students should make a note of the suggestions made by the stranger.
4. If the time available allows, the exercise could be repeated so that the students have the opportunity to speak to several strangers.
5. The students then review all the responses that they have collected.

On completion of this exercise, the students may, now, progress to the next activity.

Reflection

This could be a challenging activity for those students who are lacking in confidence talking to a stranger. This can also give some energy to the process since it makes the students psychical active.

Inspiration

Inspired by: Ann Lilith Kongsbak Rasmussen (UCN)

3.15 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 mins   Groups 2-40   Whiteboard, pen & notebooks

Steps

1   All group members write down their ideas for the solution to the challenge on their individual notebooks.
2   The teacher asks them to pass their notebook to their neighbour sitting on their right.
3   The students add to their neighbour's notebook to develop the ideas that are listed.
4   The notebook should then be passed to the neighbour on the right.
5   The notebook should be passed to all group members until the notebooks are returned to their original owners.
6   The teacher asks each student to read out their original idea and the additions which the other students have added.
7   When all the students have done this all of the ideas are pooled and retained for future use for selecting ideas.

Reflection

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

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

3.16 Electrifying

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

The aim is to encourage creative thinking to develop or refine existing solutions to the practice challenge.

5-10 mins	Groups 2-30	Whiteboard, pen & post-its

Steps

1 The teacher asks the students to pair up with someone who likes the same actor as them. The students then carry out the activity in these pairs.

2 The teacher tells the students to imagine their challenge as a physical object and then 'electrify' it.   This also applies if the challenge is a situation. For example, if the challenge concerns making dining in a restaurant a more pleasurable experience, then the floor could be perceived as an object which could become 'electrified' creating new functions as a result.

3 The teacher asks the students to continue the exercise by considering which new functions the object could have if it became 'electrified'.

4 The students write down their individual ideas on post-its and place them on the whiteboard.

5 The teacher stops the exercise after approximately 7 minutes.

6 The students review all the post-its and identify the most appropriate solutions.

Reflection

'Electrifying the Object' is particularly useful at the beginning of the creative idea generation process. However, this activity may take some training in lateral/creative thinking before it is attempted.

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

3.17 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　　　　Groups 2-35　　　　Whiteboard, phone, timer, pen & post-its

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 on the whiteboard on one post-it note per idea. (Review the drawing to your left).

3　The teacher draws a small frame on the whiteboard which will accommodate half of the ideas on the whiteboard. (Review the drawing to your left).

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 outside of the frame are discarded. The students now focus on the ideas within the smaller frame.

6　The teacher draws a smaller frame on the whiteboard which is large enough to accommodate a third of the ideas. The post-it notes which are inside the frame are placed outside the frame. (Review the drawing to your left).

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 within the smaller frame.

8　The students present their thoughts on the ideas they have put into the smallest frame.

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 points of focus this may prevent them committing to different 'niches' within the common vision.

- More visions = different projects. The students may wish to combine some of their ideas or to create heterogeneous projects which are not united by a common vision. They can work with projects that are not related to each other.

10 The students may now develop their chosen ideas. Groups can be formed based on the challenges the students are interested in.

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 allotted to each part of the activity is dependent on the number of students and the timeframe that the teacher has.

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

3.18 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 mins　　　　　　Groups 2-30　　　　Whiteboard & bag with different things &post-its

Steps

1. The teacher picks an object from the bag of different things and demonstrates how to invent a 'new thing' based on the chosen object and one of the students' objects.
2. The students are asked to form a large group in the middle of the classroom with each student taking one object from the bag. The students then pair up with someone who has the same colour of eyes as theirs.
3. The students look at the two things they collected from the bag. Within 3 mins, the pairs work together and invent 'new things' which are a combination of the two things they collected from the bag.
4. The students are brought together again. If they wish to, they are allowed to take a new object from the bag, but they may also keep the original object they took.
5. The students are asked to pair up with someone who has the same shoe size as them. 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.
6. The students note down the ideas that emerged during the exercise - 1 idea per 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 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.

This can be adapted to online teaching by asking each student to find any object nearby the computer. They have 30 seconds to find one. 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) who show their objects to the rest of the class. They then generate ideas from them. The teachers keep choosing numbers for new objects to be shown to continue the generation of ideas.

3.19 Snowballing Solutions

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

The aim is to create solutions for the challenge based on co-operation.

1 hour	Class	Whiteboard, pen, paper & post-its

Steps

1. Students are given time to think about their responses to the challenge creating 3 possible solutions incorporating the information gathered from the Analyse stage.
2. Students form groups of 2 and share their responses to the challenge with each other. The students question each other on their proposed solutions and come to a consensus on the best 3.
3. Groups should then merge and carry out the same process in part 3 and reduce the number of possible solutions until a final single solution is reached.

Reflection

This activity should be attempted after the Analyse stage. It will provide the basis to develop a robust solution and for students to scope their solutions based on the materials and research available for the challenge. Decisions are based on consensus meaning that all the students will have a vested interest in the solutions success.

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

Inspiration

Inspired by: The Centre for Teaching and Learning
https://teaching.uwo.ca/teaching/learning/active-learning.html

3.20 The Dragon's Den

Ideate   *Adapted: Calum Crosbie*   *Facilitated by the Students*

The aim is to create solutions for the challenge based on rigorous questioning.

20-30 mins   Project groups   Presentation materials

Steps

1. A student creates a presentation for their solution to the challenge.
2. The student pitches their ideas to a group of students sitting in an arc in front of them.
3. The group asks a series of set questions to the presenter about their solution.
4. The presenter answers the questions from the group.
5. The whole group analyses the responses and then discusses the viability of the ideas in the presentation.
6. Further ideas could then be presented and discussed until consensus is reached on the best solution.

Reflection

The process of rigorous questioning of the presenter should produce innovative thinking and more creative solutions as the presenter will be thinking under pressure. This could have the potential of maximizing selection of the best possible option and thus minimizing the selection/production of an inferior solution.

Inspiration

Inspired by: BBC - The Dragon's Den

3.21 Walk and Look

Ideate   *Author: Dugald Craig et al*   *Facilitated by the Students*

The aim is to create new ideas for the challenge.

30-60 mins   Groups 5-20   Whiteboard, post-its, pen & paper

Steps

1. The students go for a walk 2-4 together. The students bring a copy of the challenge to be clear all the time of what is the questions they want to ideate solutions for. The students also bring "post it notes" and a pen for writing down the ideas. Alternative the students can use their mobil for noting the idea.
2. The teachers give students a time limit of when they have to be back on the location again. If the weather is nice – they can walk outside to get inspiration for solutions for the challenge. If the weather is bad the students can do the same exercise inside.
3. The students go together - and take turns to point on an object - they see. They then look at the challenge and let what they are pointing at inspire an idea for solving the challenge. The keep pointing on objects until the time run out.
4. When they meet the deadline - they go back to the classroom and bring their stack of ideas.

Reflection

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

3.22 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 mins

Groups 2-40

Whiteboard, A3 paper, pen & post-its

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 which of the three categories the students will base and prioritise their ideas.
3   The students select the idea which they are most passionate about within the identified category.
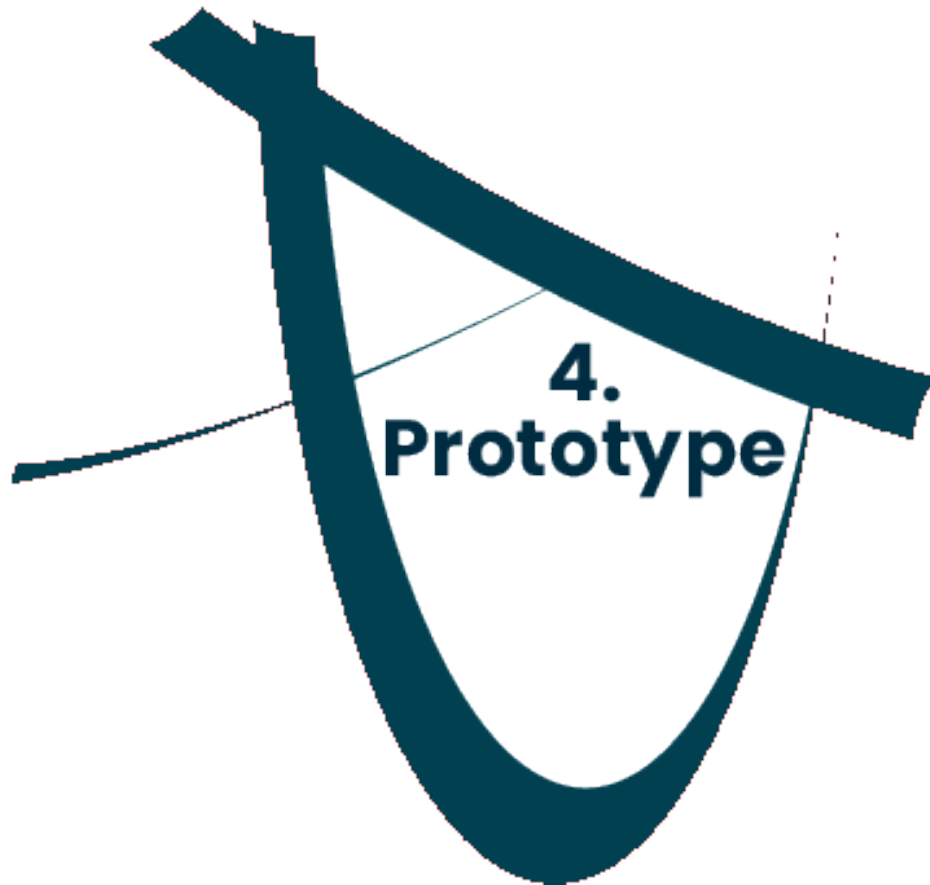
Reflection

Feasibility may be determined by constraints of time, resource constraints, lack of imagination, absence of creativity, lack of materials etc.
The activity could be done using online tools such as Padlet, virtual whiteboard and breakout rooms in Teams/Zoom.

Inspiration

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

4.
Prototype

When prototyping, the chosen ideas are given a form and are substantiated, or 'materialised', so to speak. It is imperative to visualise the ideas in order 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 ideatiation 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.

4.1 Get Real

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

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

1 Day   Groups 5-20   Whiteboard & creative materials

Steps

1. The students consider the idea/solution from the former phase (ideate) and give it a 'manifest' expression
2. The students choose materials for their model – paper/pen, building materials etc. A prototype should be created regardless 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. The students should keep a record of the discussions during the drawing/building process of the prototype. Students could also take pictures during this stage.
5. The students present their models and decide what model will be presented to the client and how it will be presented.

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.

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

4.2 Pretotyping

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

The aim is to strengthen the students' competencies in converting ideas and thoughts into 'concrete' objects reinforcing their relevance and usability for the challenge.

1-2 hours   Groups 2-40   Whiteboard, building materials

Steps

1. The teacher will have prepared the materials for pretotyping before the lesson and should demonstrate some of the uses of the materials to inspire the students.
2. The students can choose to pretotype their chosen idea from the previous phase however, this depends on the timeframe and purpose of the lesson.
3. The students are given a precise timescale to complete their pretotype and which materials they can use.
4. The students develop their pretotypes.
5. The students present their pretotypes to the group of potential users such as experts, a judging panel, the teacher, fellow students or the target group. The resultant feedback and evaluation may result in further pretotyping to improve the idea until the product or process becomes concretised and reaches the prototyping stage.

Reflection

The materials used will vary depending on what is available at the educational institute. It could include wood, plastic, polymeric foam or Lego. The process of pretotyping will be the same no matter which materials the students work with in this early stage of the prototyping processes. The pretotype stage contributes to the beginning stages of concretisation of the students'   suggested solutions and is a tool which helps students to build a link between idea generation and idea selection and action.

When doing this online, the teacher asks students to find prototyping materials from their home. Each student must build their own pretotype and show and explain it to the students via Zoom/Teams etc.

Inspiration

Inspired by: www.pretotyping.org.

4.3 Warming up for the Prototype

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

The aim is to strengthen the students' competencies in converting ideas and thoughts into concrete pretotypes.

5-10 mins   Groups 5-35   Whiteboard, bag with different things, card & phone

Steps

1. The teacher explains that the activity is time-controlled, and they will maintain time discipline throughout the activity. Each round of the activity has a set timeframe of between seven and fifteen minutes.
2. The teacher divides each project group into two sub-groups with two or three students in each sub-group.
3. The sub-groups take it in turns to pick three objects from the bag of different things. Alternatively, the students can spend 5 minutes gathering objects or picture cards for the activity.
4. The teacher should stress that the students are constructing a quick and incomplete pretotype from the objects/pictures which they have in the limited time available.
5. Within their sub-groups, the students build a basic model of the solution that they have developed.
6. The students in turn, take an object/picture card and incorporate it into the model they have created. The number of rounds is dictated by the time available. Normally, there should be objects remaining in the pile.
7. The teacher tells the students when the time is up.
8. The teacher and students discuss the students' discoveries regarding the solution and the pretotyping process.

Reflection

This activity acts as a warm-up for the pretotyping process. For some students this will be the first time they encounter this type of innovative process. Pretotyping is a tool that can support students in building a bridge between idea generation/idea selection and action

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

4.4 Makerspace – Prototype - Lab

Prototype   *Adapted: Anni Stavnskær Pedersen*   *Driven by the Student*

The aim is for students to use makerspace/FabLab/prototype lab to test and develop ideas in practice.

Weeks

Groups 1-5

Whiteboard, wood, glass, filament for 3D printers

Steps

1. The teacher outlines the task to the students:
   - A Makerspace/FabLab/prototype lab is an open workshop where one may use modern technologies like 3D printers and laser cutters as well as traditional tools. In such spaces, students can design their ideas on their laptops and then proceed to print them, make precise cut-outs in different materials or make detailed engravings on plastic, glass and metal.
   - The prototype lab should also include traditional instruments like hand tools, sewing machines and programmable embroidery machines with the capacity to sew on all types of clothing.
   - UCN has established three different prototype labs which the students have knowledge of. These have been built so that students may create high-fidelity prototypes.
2. In order to gain access to the prototype labs, UCN Innovation has developed an 'access card', which gives students and teachers access to the prototype labs as well as the use of the machines. The teachers and student have to do both a practical and theoretical test to gain the 'access card' to use the lab.
3. Further information may be found by visiting the Service Centres at the various campuses at UCN or the prototype labs.

Reflection

This activity is expensive because it requires machines 3 D printers, laser cutters, traditional tools.

Inspiration

Inspired by: IDEO and design thinking

4.5 Scamper

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

The aim is to develop the skills to create solutions for the challenge.

10-20 mins   Groups 5-10   Whiteboard, pen & post-its

Steps

1. The teacher and the students define a problem with a product, process or an idea that they want to improve on - something they are having problems with or something that is strategically a good starting point for the challenge.
2. The students use must ask as many questions and give as many answers as possible about the idea, service or product identified using SCAMPER (Substitute, Combine, Adapt, Modify, Put to another use, Eliminate and Reverse) as a guide.
3. Students form groups and ask each other the SCAMPER questions about the challenge.
4. The groups note all the answers and write them down on post-its and place them on the wall.
5. All groups review the Post-its and assess their viability in solving the problem.

Reflection

Prompts for SCAMPER questions:
 Are there **Substitute** solutions? Can we **Combine** any existing solutions? Can we **Adapt** any existing solutions? What areas can we **Modify**? What other solutions can we **Put** to another use? What processes can we **Eliminate**? What processes can we **Reverse**?

Additional help on using Scamper can be found at: http://www.ideasforideas.com/ and Mind Tool (https://www.mindtools.com/pages/article/newCT_02.htm)

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

Inspiration

Inspired by: R.F. Eberle (1972). Developing Imagination Through Scamper. The Journal of Creative Behavior, 6(3), 199–203. https://doi.org/10.1002/j.2162-6057.1972.tb00929.x

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121

4.6 Multirepresenting Ideas – Breaking Cognitive Bridges

Prototype   *Author: Diego Castro et al*   *Facilitated by the Teacher*

The aim is to represent the same idea from different approaches and channels.

1-2 Hours

Groups of 5-20

Whiteboard, bag with different things, Lego, pen & post-its

Steps

1. The teacher explains that each student of the core group should try to represent, explain and give form to their ideas for the challenge solutions using different strategies.
   - **First Step:** the students use a typical approach (e.g. ppt/oral presentations) to give form to explain their idea.
   - **Second Step:** the students draw and share their ideas using a visual thinking strategy.
   - **Third Step:** the students 'manipulate' and build a tangible model of their ideas with Lego (or similar tools) and then share their ideas with others.
   - **Fourth Step:** ¨the students dramatize their ideas by using e.g. mime, puppets, etc.
2. The students complete the activity.
3. The students discuss the results of the activity with other groups.

Reflection

This is a complex activity, but it could allow the group to learn from the different cognitive styles within the group.
The activity could be done using online tools such as Padlet, Miro, Mural, virtual whiteboard and breakout rooms in Teams/Zoom.

4.7 I Like, I Wish, What If

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

The aim is to generate positive and constructive feedback after the Ideate or the Prototype phases.

30-60 mins   Groups of 5-10   Whiteboard, pen & post-its

Steps

1. The teacher identifies the focal point of the activity (e.g. corporate image, methodology, communication tools, prototype, overall impression of a workday or meeting, etc.)
2. The teacher distributes post-it notes (one colour for each category: I Like, I Wish, What If) and divides the whiteboard into three large areas (one for each category).
3. The students complete at least 2-5 post-its for each category.
4. The students share and discuss their feedback and put it on the board. The teachers must encourage participants to build upon each other's ideas (e.g. "Yes, and….").

Reflection

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

Inspiration

Inspired by: https://spin.atomicobject.com/2018/09/12/i-like-i-wish-what-if/

4.8 Prototype Practice

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

The aim is to develop a strategy to create a prototype.

20-30 mins   Groups 4-5   Whiteboard, craft materials, virtual tools, pen & post-its

Steps

1. The teacher explains the following to the students:
   - the task builds on the Ideate stage
   - the task requires the construction of a physical/virtual prototype which also involves using a range of soft skills – teamwork, collaboration, using positive feedback and being mindful of others' opinions.
2. The students organise themselves into suitable groups and complete the following tasks:
   - thought shower ideas for creating a process for the production of the prototype. Write ideas on the whiteboard/virtual tools
   - create a checklist that reflects the challenge aims and use it to come to a consensus on the approach to creating a prototype
   - identify stages in the production process and create a workflow for creating the prototype identifying the materials required
   - allocate roles to specific parts of the workflow and develop the prototype.
3. Students then test the prototype and make notes on the checklist.
4. Students analyse the results from the checklist and refer back to the Ideate stage if necessary.

Reflection

The activity will raise students' awareness of a structured and organised process that they can synthesis and apply in this stage in the challenge. The activity will enhance students' problemsolving skills by using materials creatively to create the prototype.

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

4.9 Practical Prototype

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

The aim is to develop the skills needed to build a prototype.

1 day   Project groups   Various

Steps

1. The teacher writes the aim on the whiteboard and outlines the task to the students.
2. Students organise themselves into 2 groups - A and B.
3. Group A are tasked with disassembling a given physical object e.g. a Lego or Meccano model.
4. Group A should take note of the steps followed in disassembling the model and list all the materials used. They then create a set of instructions to reassemble the model.
5. Group B then follows the instructions to assemble the model.
6. Using a different model, the disassembling and reassembling roles are then repeated this time Group B dissembles and Group A reassembles.
7. A session at the end should review the exercise and highlight any issues that arose from the instructions in the construction of the models. Discussions could highlight the type of materials used in various parts of the models.

Reflection

The models selected should not be over complex to allow the tasks to be completed within the timescales.

This activity creates awareness of the materials needed and the importance of having a clear set of instructions to complete the tasks. The discussion at the end should encourage students to think about the sourcing, design and suitability (strength, flexibility etc.) of materials for their prototypes. This could highlight the use of certain processes or materials e.g. CAD design, digital printing, Shapelock* etc in the students own prototype model.

https://makezine.com/2011/09/28/the-many-uses-of-shapelock/

4.10 The Dragon's Den

Prototype   *Adapted: Calum Crosbie*   *Facilitated by the Students*

The aim is to present a prototype for the challenge based on rigorous questioning.

1 hour   Project group and clients   Presentation materials

Steps

1. The students create a presentation of their prototype to the clients.
2. The students pitch their prototype to the clients who are sitting in an arc in front of them.
3. The clients ask a series of set questions to the presenters about the prototype.
4. The students answer the questions from the clients.
5. The clients then discuss the viability of the prototype in the presentation and feedback to the students.
6. The students then reflect on the feedback and make any changes necessary to the prototype. They may also have to refer back to the Ideate phase.

Reflection

This activity could be used as a practice to allow the students to develop their presentation skills when they present their prototype to the clients. The process of rigorous questioning of the presenter will develop the students' ability to answer questions under pressure. It will also allow them to identify any issues with their prototype before presenting to the clients.

Inspiration

Inspired by: BBC - The Dragon's Den

4.11 Snowballing Solutions

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

The aim is to evaluate the presentation for the prototype for the challenge.

| 1 hour | Project group | Whiteboard, pen, paper & post-its |

Steps

1. Students are given time to think about their responses to the challenge creating 3 possible solutions incorporating the information gathered from the Analyse stage.
2. Students form groups of 2 and share their responses to the challenge with each other. The students question each other on their proposed solutions and come to a consensus on the best 3.
3. Groups should then merge and carry out the same process in part 3 and reduce the number of possible solutions until a final single solution is reached.

Reflection

This activity should be attempted after the Analyse stage. It will provide the basis to develop a robust solution and for students to scope their solutions based on the materials and research available for the challenge. Decisions are based on consensus meaning that all the students will have a vested interest in the solutions success.

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

Inspiration

Inspired by: The Centre for Teaching and Learning
https://teaching.uwo.ca/teaching/learning/active-learning.html

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.

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 mins   Project group   Whiteboard, picture card, pens & post-its

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.

Reflection

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

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

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 mins	Groups 2-40	Whiteboard, pen & post-its

Steps

1. The teacher asks the students to draw a rough a circle to represent a network.
2. With their respective challenges in mind, the students must fill their circle with:
   - Close contacts at its centre - close friends & close relatives
   - Good contacts a little further from the centre - colleagues, friends/acquaintances & elatives
   - Peripheral contacts at the edge - Facebook and LinkedIn connections or companies that could be relevant to the challenge
3. The teacher tells the student 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 which individual students may collaborate with to generate solutions. This activity can be connected to a lesson about the importance of network when working with innovation and entrepreneurship.

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

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 mins	Groups	Whiteboard, Lego pen & post-its

Steps

1. The students pair up with someone who has a sibling the same age as them to complete the activity (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 recognised expert/company. This principle is often employed by makers of toothpaste and toothbrushes who might use a dentist (the authority) to emphasise 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.

This activity if suitable for students trained in creative thinking.

The activity could be done using online tools such as breakout rooms in Teams/Zoom.

Reflection

5.4 Stepping Stones

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

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

1 Day	Project groups	Whiteboard, A4 paper & pens

Steps

1. The students form their respective project groups and are given a stack of A4 'stepping stone' papers.
2. The students must create concrete actions in order to complete their suggested solution. Each piece of A4 paper represents a stepping stone on their path: 1 action = 1 piece of paper. The students should write down their names and dates on each piece of paper.
3. The teacher should help the students consider the details of their stepping stones.
4. Each stepping stone ought to 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 classroom. It is essential that they have plenty of room around them and use the space actively during the activity.
6. The students 'build' their stepping stone path for their suggested solutions.
7. The groups meet after 1-2 hours and present their stepping stones to each other.

Reflection

Students will use A4 paper with each sheet 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 printed out and used in the activity.

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   Project groups   Whiteboard, computer, pen & A4 paper

Steps

1. The Project Groups should examine and analyse 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 on their research.
3. The students now take a 'trip' to the future where the prototype has been realized. In pairs, 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 place a number of A4 sheets on the floor - each A4 sheet represents a stepping stone to the realisation. 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 stand on each of stepping stones (the A4 sheets) and discuss and decide what steps to take to realise the solution thinking about the following questions: What? Where? Who? How many? Students should write the answers on the sheets of A4 paper.
7. The students gather the pieces of A4 paper 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.

Reflection

For this activity, working on the floor is important as it gives the students a feeling of moving between different time periods.
The activity could be done using online tools such as Padlet, virtual whiteboard and breakout rooms in Teams/Zoom.

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 mins	Groups 2-20	Whiteboard, PowerPoint & phone

Steps

1. The teacher asks the students and their groups to create their pitch based on the NABC* method. The pitch shouldn't last for more than 4 mins.
2. The students draw up a concrete plan for their pitch.
3. The teacher encourages the students to think about the verbal and nonverbal communication aspects of the pitch - their body language, tone, style of language (register) and the room in which they will pitch. If the students want to do so, they may, also, film their pitch to explore the unconscious elements of communication 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 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

Inspiration

Inspired by: Curtis R. Carlson, William W. Wilmot Stanford University (Carlson & Wilmot, 2006)

5.7 Presentation Participation

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

The aim is to gather feedback from clients to enhance the development of the prototype.

20-30 mins   Project groups and clients   Presentation materials & a digital platform

Steps

1. Students record their presentation of the prototype and upload it to a digital platform. Clients are given access to this.
2. Clients are asked to review the presentation and post comments (text/video/audio) on the digital platform. The platform should include headings that reflect the brief of the challenge. This activity should be open for a number of days to allow for client's feedback.
3. All comments are reviewed by the students and any minor improvements should be made to the prototype.
4. Clients are invited to a face-2-face presentation of the updated prototype.
5. Clients reflect on the presentation and then post feedback on Padlet.
6. Students then review the comments and answer any questions from the clients.
7. Both groups then reflect on whether the brief's aims have been achieved.

Reflection

The activity gives some ownership of the process to the clients and encourages a constructive approach from both groups. For the students, it reinforces the idea that failure is a crucial part of the learning process as they may have to return to the 'Ideate' phase to propose solutions to identified problems.

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

6. Evaluate

Lastly in the 6 elements of innovation is the evaluation. This evaluation is composed of two parts: an external part where 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 oganisation that made the challenge, but if possible, it can be feedack 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 more be a more emergent evaluation.

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 minutes   Participants 2-40   Whiteboard, pen & post-its

Steps

1. The teacher organises 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 discuss the feedback and highlight 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.

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

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 minutes   Participants 2-40   Whiteboard, pen & post-its

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.
   - The furniture is organised into a suitable format.
2. Each group presents their suggested solutions to the evaluation panel.
3. The evaluation panel feedback 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 is 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 or not they will use the group's solution.
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.

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

6.3 Share Your Pearls of Wisdom

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

The aim is to evaluate the information gained from the learning experience.

20-30 minutes   Groups 10-40   Whiteboard, pen & post-its

Steps

1. The students are divided into two equally large groups. The first group forms an inner circle while the other forms an outer ring around the first.
2. The inner circle faces the students in the outer ring. Those standing opposite one another pair up. If there is an odd number than a group of 3 should be formed.
3. The members of the inner circle share their 'pearls of wisdom' with their partners from the outer circle telling them the following:
   - What they have learned from the lessons?
   - Which prototypes they have developed for their challenges?
   The outer circle writes down all the responses.
4. Students in the outer circle take a step to the right and meet their new partners and, after doing so repeat, step 4. The students in the outer circle should write down all the responses highlighting anything that has been repeated from their previous partner. Steps 4 and 5 are repeated for as long as time allows.
5. The roles are reversed and step 4 repeated. Equal time should be given to each group.
6. The teacher asks the students to discuss these points after they have written the activity:
   - Did their partners tell them something new?
   - Did they repeat things that had already been said?
7. The students discuss their experiences of being a listener with their group.
8. The activity can be repeated if necessary. This may focus on the challenge the students worked with during the innovation process.

Reflection

This activity is good for concluding the innovative learning process.

6.4 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	2 Groups	No materials

Steps

1. The teacher and/or the students create an evaluation criteria and a checklist. The teacher could use the evaluation criteria used by The Danish Foundation for Entrepreneurship.
2. The students are organised into their project groups - Group A and Group B - each prepare presentations for their challenges. Group A present their idea to Group B who evaluate the ideas in their presentation. Group B gives constructive verbal feedback completing the checklist and by giving a grade for the project.
3. The roles are reversed with Group B presenting and Group A evaluating.
4. The Groups then collate 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.

Reflection

The Danish Foundation for Entrepreneurship https://eng.ffe-ye.dk/58364 or this link p. 11-15: https://supeng.ffe-ye.dk/media/791567/regionale-mesterskaber-i-entreprenoerskab-guide-til-underviseren-og-bedoemmelsekriterier-en.pdf

It would be helpful if self-assessment was supplemented by some of the criteria evaluation forms described above, as this would provide students with relevant feedback in addition to that which they have gathered during this activity. This activity can be extended with the addition of external co-workers in the evaluation process.

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

Inspiration

Inspired b: Adler, Philip M., and Eddie Good: The Impact of Self- and Peer-Grading on Student Learning

6.5 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   **Participants 5-3**   **Computer, whiteboard, A2 paper & pen**

Steps

1. Students write the challenge in the middle of a large piece of A2 paper.
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 A2 sheets. 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.

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

6.6 Fishbowl

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

The aim is for students to gain insight into others' perspectives on the challenge.

1-2 hours   10 students   Whiteboard, pen & post-its

Steps

1. The students create 2 groups A and B.   A is the inner group and B is the outer group.
2. The teacher gives the following question to Group A to discuss:
    - To what extend did the challenge solution meet the needs of the client's brief?
3. Group B observes the discussion and takes notes. Group B cannot interrupt or participate in the discussion. However, they should be encouraged to reflect on their own performance in the task during their listening role.
4. The groups change places and Group B continues the discussion, with Group A observing and taking notes.
5. Students then reflect on the activity and on the differing perspectives that they have observed.
6. Students write points on the whiteboard for class discussion and try to reach a consensus to progress the challenge.

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Reflection

The inner group will allow for more points of view to be expressed and then either refuted/reinforced/developed by the second group. By using prompts from the speaking group, members of the listening group will be able to reflect on their own performance in the task.

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

Inspiration

Inspired by: The Centre for Teaching and Learning
https://teaching.uwo.ca/teaching/learning/active-learning.html

6.7 One Minute Paper

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

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

30 mins   Project group   Whiteboard, pen, paper & post-its, Padlet

Steps

5. 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?
6. The students write down at least 4 evaluative points about the solution.
7. The teacher creates 2 columns on the board – 'Strengths' and 'Weaknesses'. The students reflect on their points and write them under the appropriate headings.
8. 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.

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

Inspiration

Inspired by: Cross and Angelo (1988)

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

6.8 Real Time Reactions

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

The aim is to evaluate the solution for the challenge.

30 mins	Project group	Pen & paper, group presentation & online platform

Steps

1. The teacher plays the challenge presentation to the project group.
2. The project group makes real time comments on the presentation on Padlet/Twitter.
3. The project group reviews all the 'live' comments. They then order and structure the points into headings and sub-headings.
4. The project group discusses all the comments and collates an 'Action Plan' to improve the presentation.

Reflection

The challenge presentation has been created by the project group. This activity could be used to evaluate the groups' presentation to the clients. It will introduce new ideas and points of view to students which can lead to the awareness of others' perspectives and different ways of approaching problems. The creation of an 'Action Plan' gives students ownership over the process and of creating their own solutions to any issues.

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

Inspiration

Inspired by: Centre for Academic Teaching

https://cat-database.sites.uu.nl/learning_activity/real-time-reactions/

6.9 Muddiest Point or Crystal Clear

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

The aim is to peer review the presentation for the prototype.

30 mins   Project group   Pen & paper & group presentation

Steps

1. The students should prepare a presentation on the completed prototype. Two of the students should deliver this to the rest of the project group.
2. The project group is given a sheet of paper with the two columns on it - 'Muddiest Points' and 'Crystal Clear'.
3. The 4 students are then given some time to review the prototype presentation and then write down some comments/questions about the presentation.
4. Student responses are then collected at the end of the session.
5. The teacher can then feedback to the students and discuss the points from the group, identifying areas of strength and areas for development.
6. The group makes any appropriate changes to the presentation.

Reflection

This mega cognitive activity enables students to peer review and evaluate their preparation for delivering their prototype presentation to the clients. It will identify strengths and areas for development regarding the presentation and its content. Comments from the students should focus on the content of the presentation with constructive positive feedback given to the presenters. A positive and supportive approach to this activity will create a group problem-solving ethos amongst group members.

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

Inspiration

Inspired by: Professor Mosteller (1989)
Centre for Teaching and Learning https://teaching.uwo.ca/teaching/learning/active-learning.html

6.10 Positive Presentation

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

The aim is to peer review the practice presentation of the prototype.

20 mins   Project group   Whiteboard, ppt, pen & post-its

1. The students should prepare a presentation on the completed prototype.
2. Two of the students should deliver this to the remaining 4 students.
3. The students are then given time to peer review the presentation and asked to write down some comments/questions about the presentation.
4. Student responses are then collected at the end of the session.
5. The teacher can then feedback to the students and discuss the points raised as a group identifying areas of strength and areas for development.
6. The group makes any appropriate changes to the presentation.

Steps

Reflection

This activity should concentrate on the importance of effort, praise and a positive use of language towards others e.g. Can we work though a problem together? It should create an awareness of others' feelings and responses towards the learning task. The activity can also develop a student's sense of becoming socially and visibly confident.

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

Conclusions

The collaborators were in a unique situation when they developed the ForEmLink, 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 were 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 ForEmLink. 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 Atom and the Spheres 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 ForEmLink will provide a platform that will bring 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.

Digital Toolbox

Tool	Link
Brainstorming	**Mind Tools** https://www.mindtools.com/brainstm.html **Content Marketing Institute** https://contentmarketinginstitute.com/2020/04/brainstorm-content-ideas-remotely/
Design	**Sketch** https://www.sketch.com/ **Invision** https://www.invisionapp.com/
Enhancing Creativity	**Aalborg University** https://www.uka.aau.dk/ **Mind Tools** https://www.mindtools.com/pages/article/newCT_88.htm **Lucidchart** https://www.lucidchart.com/pages/
Mural	**Mural** https://www.mural.co/
Presenting	**Presencing Institute** https://www.presencing.org/resource/tools **Pitcherific** https://pitcherific.com/ **Mentimeter** https://www.mentimeter.com/
Prototyping	**Marvel** https://marvelapp.com/ **Lego Games** https://www.minijuegos.com/juego/lets-go-build-a
Whiteboard/Collaboration	**Boldare Boards**

	https://boards.boldare.com/ **Miro** https://miro.com/ **Padlet** https://en-gb.padlet.com/ **Whiteboard.fi** http://www.whiteboard.fi https://www.youtube.com/watch?v=dNEJrMJPRQQ **Ziteboard** https://ziteboard.com/

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150

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