Programme STEM, 8 and 9 June 2016, School for the Future

8 June 2016, 09.00 – 12.30, Crealucion, School for the Future

- Introduction **Creative Mindset**: growth mindset and principles of inventive thinking (fanning and funneling)
- Introduction **ICE-model** *(Innovation, Creativity & Entrepreneurship***)**: a model that describes the steps in a creative process

9 June 2016, 09.00 – 12.30, Crealucion, School for the Future

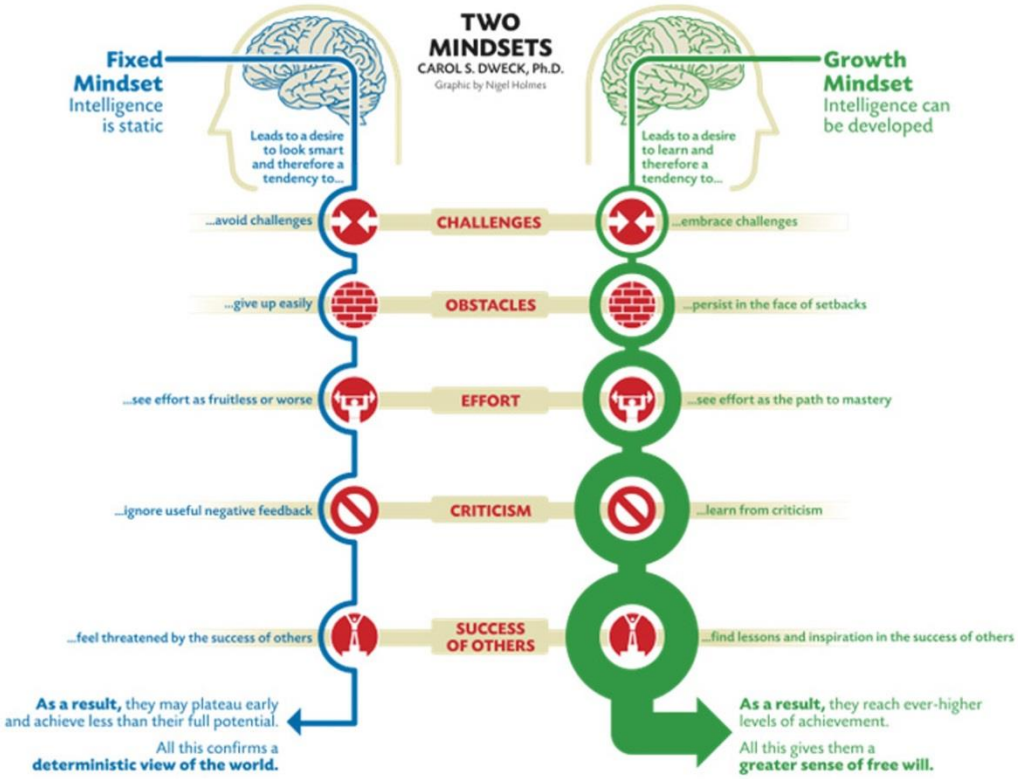
- Applying the principles of inventive thinking and the steps of the ICE-model on a – STEM related - challenge.

The Creative Mindset

The creative mindset is about attitude and is combination of a growth mindset combined with the application of the principles of fanning and funneling.

Growth mindset

There are two mindsets: a growth mindset and a fixed mindset. With a growth mindset you are convinced that you can develop your creativity and that you can improve and learn from others.



Inventive thinking

When looking for solutions for triggers or when looking for new ideas there are two clearly distinctive and separated ways of thinking: creative thinking and critical thinking.

Creative thinking, the making of lists – taking into account the relevant principles – is one of the two basic skills for inventive thinking.

Suspend judgement: Delay your judgement, do not react immediately so that the flow of ideas is not interrupted.
Go for quantity: The more ideas you come up with, the bigger the chances are that one of them is a good idea.
Combine and improve: Making connections between existing ideas is the basis on which you build new ideas.
Seek wild and unusual ideas: When looking for new creative ideas, don't impose any limitations whatsoever.
Take a creative pause: Sometimes a good way to come up with ideas is to stop thinking deliberately. Sleep over it.

CRITICAL THINKING

CONVERGENT THINKING / FUNNELING

Critical thinking, the making of choices, – taking into account the relevant principles – is one of the two basic skills for inventive thinking.

Judge constructively : Focus on the positives and possibilities of an idea.
Check your objectives : Critical thinking is also the ability to say no to good ideas that do not fit your goals. Check your evaluation criteria.
Consider novelty: Select the new ideas you were looking for and at the same time pay attention to the brilliant ideas that cross your path.
Take a creative pause: It is not always that you have an opinion about something right away and this is not necessary. Let it sink in by not thinking consciously. Let your unconscious mind do the work. Sleep over it.

The ICE-model

If you are looking for outside-the-box solutions you cannot do without inventive thinking power. Inventive thinking means alternating creative and critical thinking in all the steps of the creative process. It is a constant process of divergent thinking (fanning) and convergent thinking (funneling). A growth mindset in combination with the mastery of these thinking skills, make up the creative mindset that is conditional for the innovation process.

Over the past seventy-five years several models have been developed to describe the creative process that leads to innovation: Creative Problem Solving, think*x* Productive Thinking Model, Design Thinking, Lateral Thinking et cetera. Basically these models are pretty similar, but each of the models focuses on different aspects.

The ICE model, the model for *Innovation, Creativity & Entrepreneurship* is based on several of these models and the corresponding thinking tools. By the way this model is not static and it is also not comprehensive.

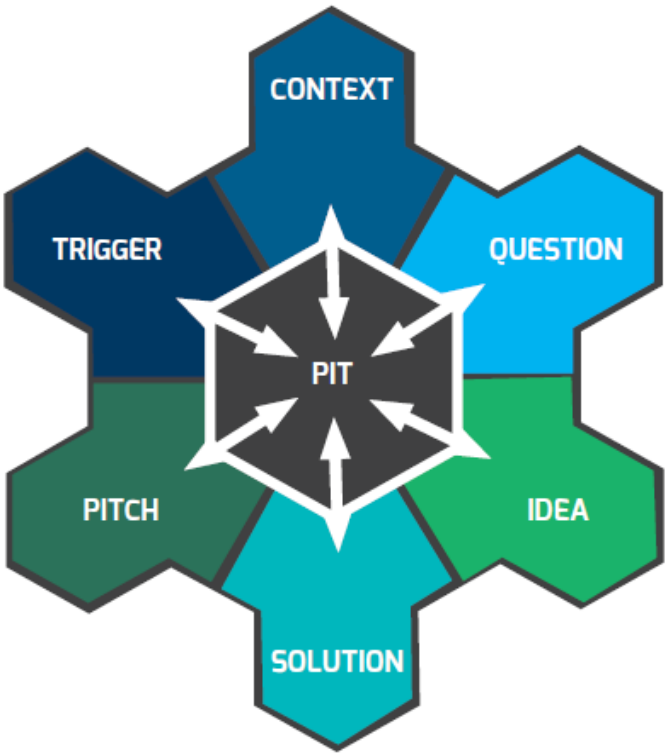
Developments in the field of brain research and innovation are still going on. Within the steps, within the framework, it is therefore possible to add things and to leave things out. As soon as you master the creative process better, you can personalize the ICE model more and more using the thinking tools that fit you best.

A model gives insight and overview and provides a common language. But a model always remains a simplified reflection of the (creative) reality. Reality – the creative process in practice – is always more complex and more chaotic than a model seems to imply. In a model, reality seems like a very structured process, in which you go through the steps in an orderly and fixed order. This may be so, but in pratice the creative process – like the thinking process in the brains – is sometimes not so linear. Sometimes you start at the beginning, sometimes in the middle and sometimes at the end. Some steps overlap and to a certain extent some steps intertwine. But paradoxically creativity and innovation cannot do without structure. A model with accompanying techniques is always something to fall back upon and helps you to go on with the innovation process in a structured way. 11

The more you are trained and the more experienced you are in working with the ICE model, the more you can move away from it. Gerard Puccio, chair of the International Center for Creative Studies at Buffalo State College, indicates that there are four phases of development in becoming a *Creative Change Leader).* From *unconscioulsy unskilled* to *consciously unskilled,* and then from *consciously skilled* to *unconsciouly skilled*. The first step of course is to become conscious but then you have to become skilled. The more you are trained, the more experienced you become the more you can unsconsciously apply the innovation steps and the more the iDNA becomes part your genes. The ICE model is an aid, a checklist to help you with that. But just knowing the principles, the rules or tools related to innovation is not enough. It is through training, but after that especially by gaining a lot of pratical experience that creativity can become part of your DNA more and more. Not until you display creative behaviour, without consciously thinking about it, you can consider yourself a Creative Change Leader.

THE CREATIVE PROCESS

ICE-MODEL



- **PIT:** The cockpit, the creative pit stop. Reflecting on and planning the steps in a creative process.
- **TRIGGER:** The stimulus. The trigger may be a problem, dream, theme or task.
- **CONTEXT:** Clarifying the trigger. Gathering information, doing research and analysing data.
- **QUESTION:** Formulating a future dream and core question. Preparing a brief.
- **IDEA:** Brainstorming, coming up with many alternatives and selecting an idea.
- **SOLUTION:** Developing an idea into a solution using feedback and prototyping.
- **PITCH:** Pitching the solution in a convincing way.

You do not always go through the steps linearly. It may be that you find out in step 5 (Solution) that it is a dead end and that you have to go back to the previous step. It may also be that you already have a clearly formulated goal. In that case you don't start with step 1 (Trigger), but with step 3 (The Idea) et cetera. In the end you have gone through all of the steps but the itinerary may vary.

In practice the thinking process is an iterative, cyclical process: sometimes two or three steps forward and sometimes two or three steps back. Consider the ICE-model as a framework, a compass to help you determine where you are in the process. And consider the suggested thinking techniques as tools that you can choose from, depending on which tools serve your purpose best.