



Creative and Innovative Thinking

Unit 2.1 Creativity Enables Innovation



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What expects us in this unit?

- Creativity
- Creative thinking
- Positive Aspects of being creative
- Marshmallow Challenge
- Innovation
- Innovative Thinking
- Brainstorming
- Mindmapping



But first ...



Name crossword

- N ice
- A uthentic
- M otivated
- E ntusiastic



What means creativity?



What is creativity?

- What means creativity to you? Think five minutes about it and write down 2-3 words that come to your mind.
- Then discuss them five minutes with the person sitting next to you. Are there any differences or similarities?



thinking outside the box

ambitious

solving a problem

useful

interesting

Creativity

art

make something new

doing something different

process

open-minded

science



Definitions about Creativity

- “To me, creativity is seeing and communicating ideas in ways that are unique, compelling, and unexpected.” – Lee Odden
- “Giving the world something it didn’t know it was missing.” – Daniel Pink
- “Building universes out of nothing.” – Danny Sullivan



Which myths about creativity do you know?



Myths about creativity

- “MYTH 1: Creativity is only needed at the top
- TRUTH : In today’s business environment, creativity applies to everyone. The organizations that win in these challenging times have creativity as a core priority at all levels of the organizational chart. We must embrace the concept of Everyday Creativity: fresh ideas and creative problem solving in every business setting. Every meeting. Every customer interaction.
- MYTH 2: People are creative (or not) based on what they do
- TRUTH: Your role has nothing to do with your creativity. There are professional musicians in major symphonies that are great technicians but don’t use an ounce of creativity. There are also statisticians that are brilliantly creative. Don’t let labels dictate or limit your creativity.”



Myths about creativity

- “MYTH 3: Creativity can’t be developed
- TRUTH: As human beings, we all have tremendous creative capacity; we just need to develop it. Your level of creativity isn't fixed at birth. Instead, think of creativity as an expandable muscle. You don't become a champion bodybuilder without hitting the gym. Similarly, to build creative capacity requires some practice and focus. There is an overwhelming amount of scientific research confirming that you can grow your creativity at any age.
- MYTH 4: Creativity isn't my job
- TRUTH: Today, creativity is everyone's job. For your organization to enjoy success, creativity must be harnessed at all levels. It is no longer just something those “art people” do. There isn't a job function that can't benefit from creative problem solving, fresh ideas for the future, or simply finding a better way.
- MYTH 5: My technical skills and experience are enough
- TRUTH: Maybe in the past, but not in the future. Unorthodox approaches, original thought and imagination have become the currency for success in the new world of business...and life. The difference between getting a promotion, making the sale, raising capital, or reaching your full potential lies in your ability to embrace and nurture your creative potential.”



Which characteristics about creativity do you know?



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Characteristics of creative thinking

- In order to be creative, a person should be very aware of the problems in her/his circumstances. A creative person is aware of the problems present in her/his circumstances and makes every effort to find out new solutions to these problems.
- Dynamic Thinking: A creative person not only thinks creatively, but she/he will be having dynamic thinking. She/He has more capacity of adjustment, but this tuning is sought through new combinations.
- The most important characteristic of creativity is divergent thinking. Divergent thinking involves continuity, flexibility, and originality. These qualities can be observed in the works of great scientists, philosophers and literary thinkers.



Characteristics of creative thinking

- An important trait of creative thinking is flexibility of thinking and behaviour. The creative person is always prepared to adopt new attitude, ideas or behaviour.
- Originality is an essential feature of creative thinking. A creative person is not confined to ideas or experiences. She/He uses new ideas, new attitudes and new methods.
- In order to achieve the above mentioned traits of creative thinking, the creative person should have sufficient curiosity. It is due to curiosity that a person is anxious to know new things in any field. It is due to curiosity again that she/he seeks to utilize new methods.



Characteristics of creative thinking

- An ordinary person is generally confined to her/his immediate environment and circumstances and hence cannot rise above it. A creative person on the other hand, has the ability to go beyond the immediate circumstances and show novelty in thinking and behaviour.
- In order to find out new solutions, it is necessary that the problem should be looked from a new point of view. The object of thinking should be novel and valuable. Thinking should be divergent, highly motivated and constant.



Which characteristics about creativity do you know?

Think about it for 2 minutes and then talk about the topic with a person of your choice

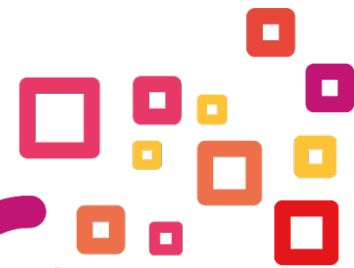


Why is creative thinking also helpful in everyday life?





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Marshmallow Challenge



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Marshmallow Challenge

- Aim of the game:
 1. Build a freestanding tower as high as possible.
 2. Only materials from the prepared packages are allowed to be used.
 3. The whole marshmallow must be placed at the top.
 4. Measure from the table top to the top of the marshmallow at the end.
 5. You have 18 minutes.



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Marshmallow Challenge

STOP!



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Congratulations
to the winning team!



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Marshmallow Challenge

What experience do you take
away from this?



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What is innovation?



something new

business

modernization

new method

idea

Innovation

new products

transformation

change

builds a new market



Characteristics of innovative thinking

- 1. Curiosity
Curiosity is the first step toward discovery. It is the “beginner’s mind,” a deep, child-like sense of wonder about the world, the relationship between different things and how things work.
- 2. Imagination
Before you can develop a new idea, you must first be able to conceive it, to envision the very possibility that it could exist. Innovation is fueled by leaps of the imagination, making novel new connections between seemingly disparate ideas, concepts or objects.
- 3. Intuition
Making decisions based on facts and figures is fine in many instances. But true innovation is more often born from that internal “knowing,” the guiding force, sixth sense or gut feeling to follow one’s instincts, no matter how unconventional or illogical the direction.

Characteristics of innovative thinking

- 4. Inventiveness

The ability to change the status quo requires an inquisitive passion for “tinkering.” Innovators possess the desire to arrange and re-arrange ideas or things in new and different combinations.

- 5. Playfulness

It is when you get “lost in your work” that amazing things begin to happen. Time, self-consciousness, seriousness and any sense of limitation falls away, and challenges are handled with ease. The attitude of playfulness is, “Everything is possible.”

Characteristics of innovative thinking

- 6. Flexibility

The capacity to suspend judgment and embrace two (or more) seemingly contradictory or unrelated viewpoints at the same time helps create a dynamic tension that ultimately stimulates creative resolutions (solutions).

- 7. Persistence

All the creative talent in the world is of no value if you give up before the work is done. Persistence, the passion, willpower and enthusiasm to overcome setbacks and discouragement, allows innovative thinkers to keep trying new possibilities until success is achieved.

Innovative thinking

- Be Curious
- Be Passionate
- Be Willing to Fail
- Take Action
- Use Both Parts of Your Brain



What is the **difference** between
creative thinking and innovative
thinking?

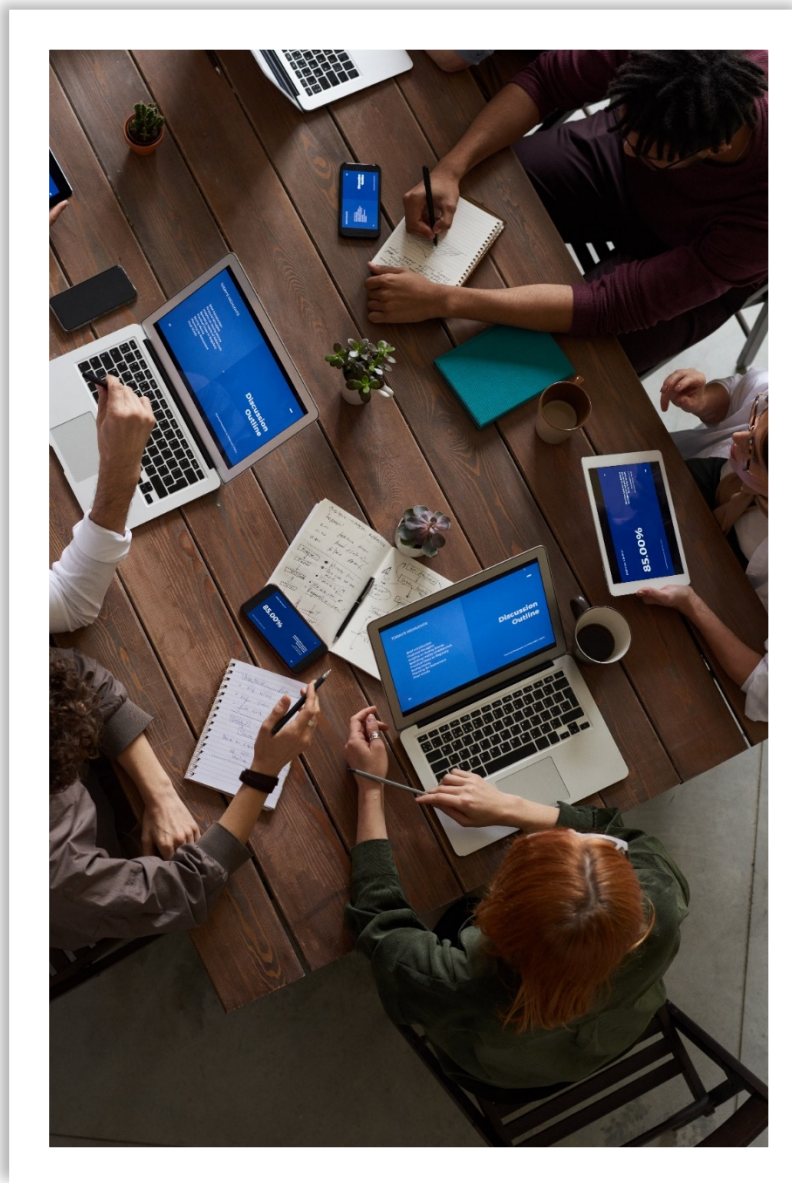


Creative vs. Innovative thinking

- Creativity is the highly imaginative way of thinking and acting
- Creativity = tool for the innovation process
- Innovation is a new or renewal of a condition
- Innovation = goal of the process

Without creativity there
is no Innovation





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Brainstorming

Basic Rules

1. Focus on quantity
2. Withhold criticism
3. Welcome unusual ideas
4. Combine and improve ideas



What could be the benefit of creative thinking in STEM and therefore industrial branches?

You have 20 Minutes

Now we will have a
short break!
See you all in 10
minutes!

short summary

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Creative thinking stimulates inventions and innovations

Economic advantage due to critical and creative thinking from a young age.

to optimize processes and products and thus increase the added value

the value of creative thinking

increases the motivation of employees and, as a result, the working atmosphere

to use resources more carefully

the possibility of creative spending promotes the satisfaction of the employees

motivate to think sustainably

higher value



Application of known solutions
to new areas. Example: Bionics.

The improvements will
allow the company to save
money.

to optimize processes and
products and thus increase
the added value

The value of innovative thinking

create new/improved
products

to use resources
more carefully

process flow can be
improved and therefore
shortened

motivate to think
sustainably

employees are under less
pressure





Now we go with
MINDMAPPING

Be creative!



Words, symbols, ...

write the topic in the middle of
the page

How can this goal be
achieved?

Mindmapping

What do you want to
change?

Be creative!

process

open-minded

How can you change
that?



Thank you for your attention!

