Creativity and Innovation

At present these two words are being so much pronounced, quite often I have got confused with the meaning of these two words, hence I am writing this to understand myself to know what these words stand for.

For the last 6-7 years I am directly or indirectly involved in the development of a micro-air-vehicle system with some of my colleagues at our University. It was briefed to us by a sponsoring agency to find a solution to study a situation happening in a closed room with glass windows located around 2 kms., from a central place using wireless cameras. To provide the solution, we proposed a system that had an unmanned micro quad copter with wireless video camera and associated embedded technologies mounted on it to study the situation and the solution was considered to be a creative one by the agency. With time, we became more experienced, we improved our design capabilities, started adopting new technologies and became more confident about our system and started realising its scope. Now we provide aerial survey, forest fire detection services and exploring for many more services applications and I think that, this is innovation. I suggest you to listen to ted talks on drones or watch drone videos on **www.youtube.com** to know what drones can do for humanity.

Then what is creativity and innovation? Whether anybody can be creative? Innovative? Whether one needs formal qualifications to become creative and innovative? How do we foster a culture of creativity? Whether all creative and innovative solutions to problems bring only benefits? Are there any creative and innovative ideas destructive to human kind? Whether structured thinking influences creativity and innovation? Are there any other cognitive skills that we should develop to become more creative and innovative? And how do we prepare our students to become creative and innovative and make them experience that they can create.

Creativity is the act of turning new and imaginative ideas into reality. Creativity is characterised by the ability to perceive the world in new ways, to find hidden patterns, to make connections between seemingly unrelated phenomena, and to generate solutions. Creativity involves two processes: thinking, then producing. If you have ideas, but don't act on them, you are imaginative but not creative. [http://www.creativityatwork.com/2014/02/17/what-is-creativity/]

Innovation is the implementation of a new or significantly improved product, service or process that creates value for business, government or society.

The objectives of creativity and innovation is value creation.

Creativity begins with a foundation knowledge, learning a discipline, and mastering a way of thinking. You learn to be creative by experimenting, exploring, questioning assumptions, using imaginations and synthesising information. Learning to be creative is akin to learning a sport. It requires practice to develop the right muscles, and a supportive in which to flourish.

[http://www.creativityatwork.com/2014/02/17/what-is-creativity/]

A study by George Land reveals that we are naturally creative and as we grow up we learn to be uncreative. Creativity is a skill that can be developed and a process that can be managed. People become more creative if opportunities, encouragement, training are provided and motivated.

People can be trained to be innovative. To become innovative one needs to develop five key behaviours that optimise the brain for innovation [The Innovator's DNA]. They are:

1. **Associating**: drawing connections between questions, problems, or ideas from unrelated fields
2. **Questioning**: posing queries that challenging common wisdom
3. **Observing**: scrutinising the behaviour of customers, suppliers, and competitors to identify new ways of doing things
4. **Networking**: meeting people with different ideas and perspectives
5. **Experimenting**: constructing interactive experiences and provoking unorthodox responses to see what insights emerge

The HP has proposed the following simple rules to foster a culture of creativity and innovation in (1999 HP Annual Report)

- Believe you can change the world
- Work quickly, keep the tools unlocked, work whenever
- Know when to work alone and when to work together
- Share-tools, ideas. Trust your colleagues
- No politics, No bureaucracy (these are ridiculous in a garage)
- The customer defines a job well done
- Radical ideas are not bad ideas
- Invent different ways of working
- Make a contribution every day, if it doesn't contribute, it doesn't leave the garage
- Believe that together we can do anything
- Invent

All creative activities are supposed to create values provided they are evaluated judiciously and enough care needs to be exercised by the society to avoid misuse of innovations made out of the creativities to meet other goals. People with creative and innovative bent of mind and abilities should not be demotivated by giving golden goose treatment.

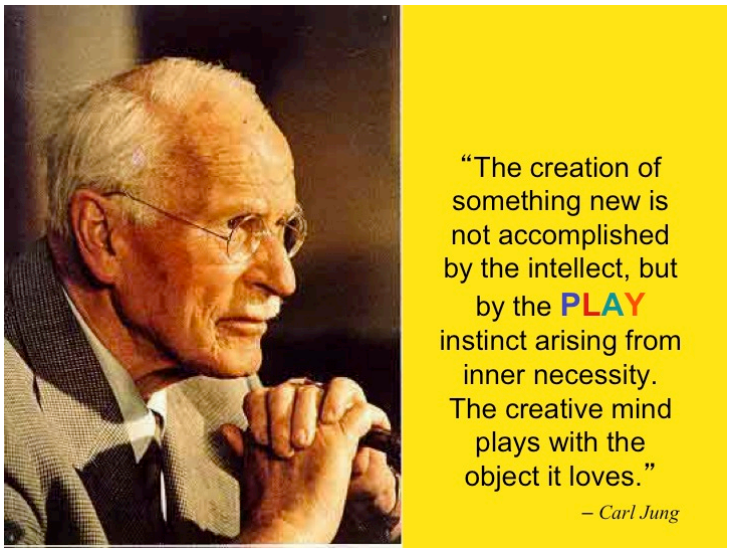
I wanted to explore that many of us, especially people with engineering background are structured thinkers. Whether structured thinking help us to become more creative and innovative?

Creativity needs application of critical, analytical and problem solving skills to generate a creative solution to a problem. It is essential to have the sound subject knowledge, ability to conceptualise a creativity, evaluate creative concepts, design and develop and the structured thinkers can be best bet for creativity and innovation activity.

I suggest students to study the attached PowerPoint presentation to know more about creativity and innovation and what they should learn to become more creative! Creative and Innovative Thinking

Students can devise creative and innovative solutions to the problems posed by the University to participate in Annual Student Competitions and Exhibitions Competition. It is mandatory for students at M.S. Ramaiah University of Applied Sciences to take part in such competitions organised by the University or the University encourages students to participate in competitions organised by any global organisation to foster culture of creativity and innovation in the University.

Let me close this with a quote



Prof. S.R. Shankapal

Creative and Innovative Thinking Skills

Contents

Creativity and Types of Innovation

What is Creativity?

Creativity

Bringing into existence an idea that is new to you

The practical application of creative ideas

Innovation

Creative Thinking

An innate talent that you were born with and a set of skills that can be learned, developed, and utilized in daily problem solving

What is Creativity?

Creative solutions are more than ideas - they must work in the real world. A creative solution has three attributes:

- It is *new* (otherwise it would not be creative).
- It is *useful*, in that it solves the problem (otherwise it would not be a solution).
- It is *feasible*, given the messy real world constraints like money and time.

Types of Innovation

- ***Business Model Innovation*** involves changing the way business is done in terms of capturing value e.g. HP vs. Dell, hub and spoke airlines vs. Southwest

- ***Process Innovation*** involves the implementation of a new or significantly improved production or delivery method.

Types of Innovation

- ***Product Innovation***, involves the introduction of a new good or service that is new or substantially improved. This might include improvements in functional characteristics, technical abilities, ease of use, or any other dimension.

- ***Service Innovation***, is similar to product innovation except that the innovation relates to services rather than to products

Don’t Believe the Experts !

“That’s an amazing invention, but who would ever want to use one of them?” (US President Rutherford B. Hayes, after participating in a trial telephone conversation between Washington and Philadelphia in 1876).

“Television won’t be able to hold onto any market it captures after the first six months. People will soon get tired of staring into a box every night (Darryl F. Zanuck, Head of 20th Century Fox, 1946)

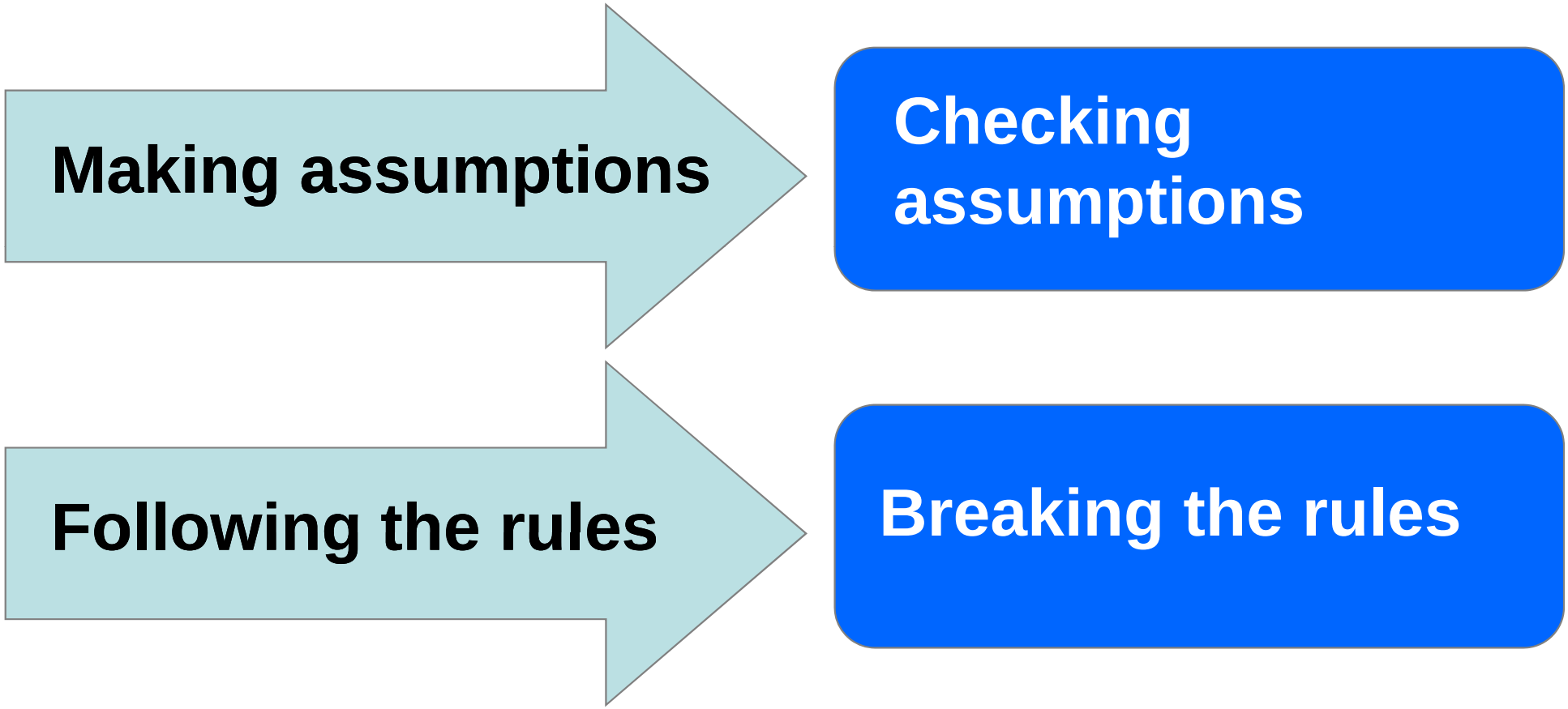
Don’t Believe the Experts !

“The horse is here to stay, but the automobile is only a novelty, a fad” (President of Michigan Savings Bank, 1903, advising Henry Ford’s lawyer not to invest in the Ford Motor Company – disregarding the advice, he invested $ 5,000 in stock, which he sold several years later for $ 12,5 million).

“I think there is a world market for about five computers (Thomas J. Watson Sr., Chairman of IBM, 1943)

Conceptual Blocks to Creativity

Blocks and Blockbusters to Creativity



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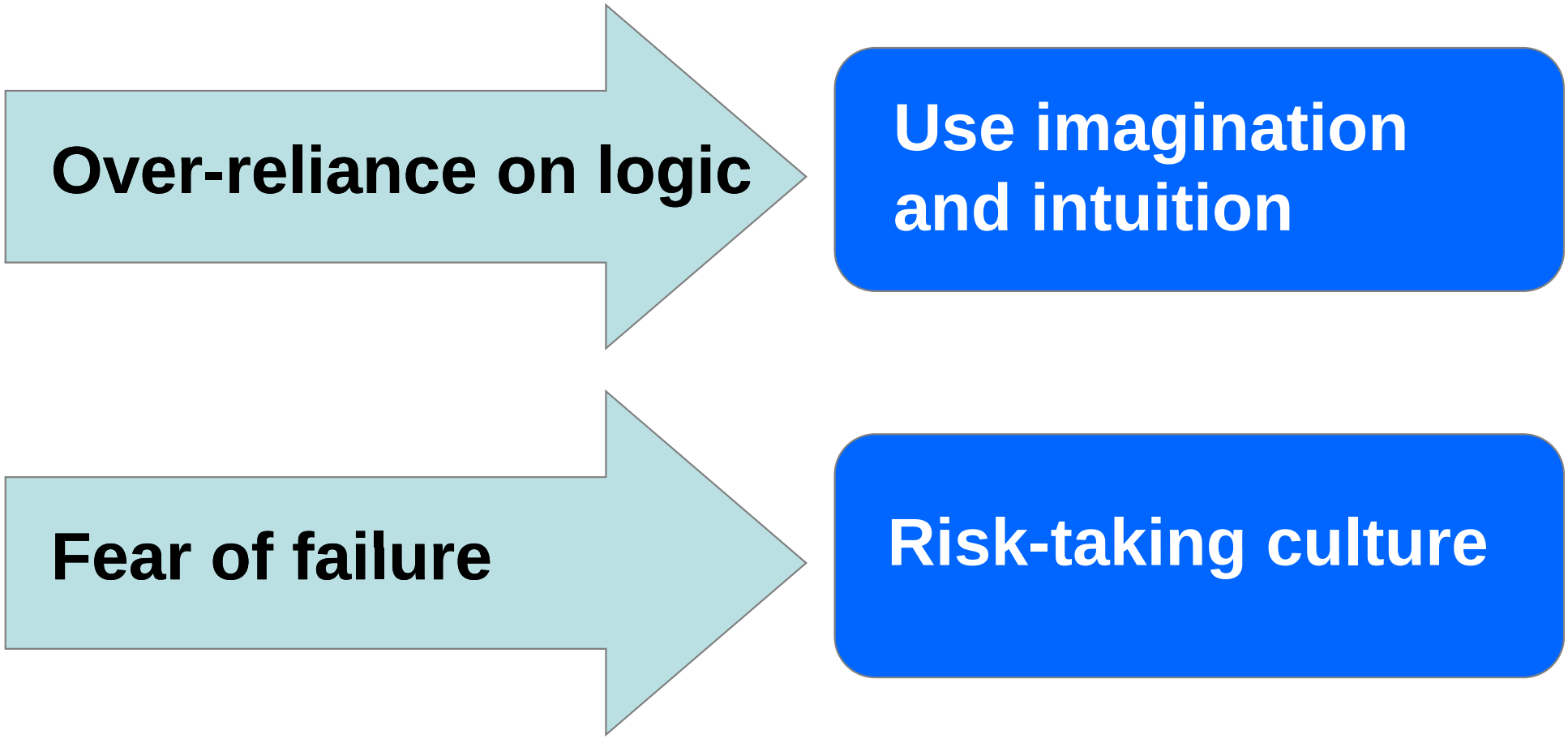
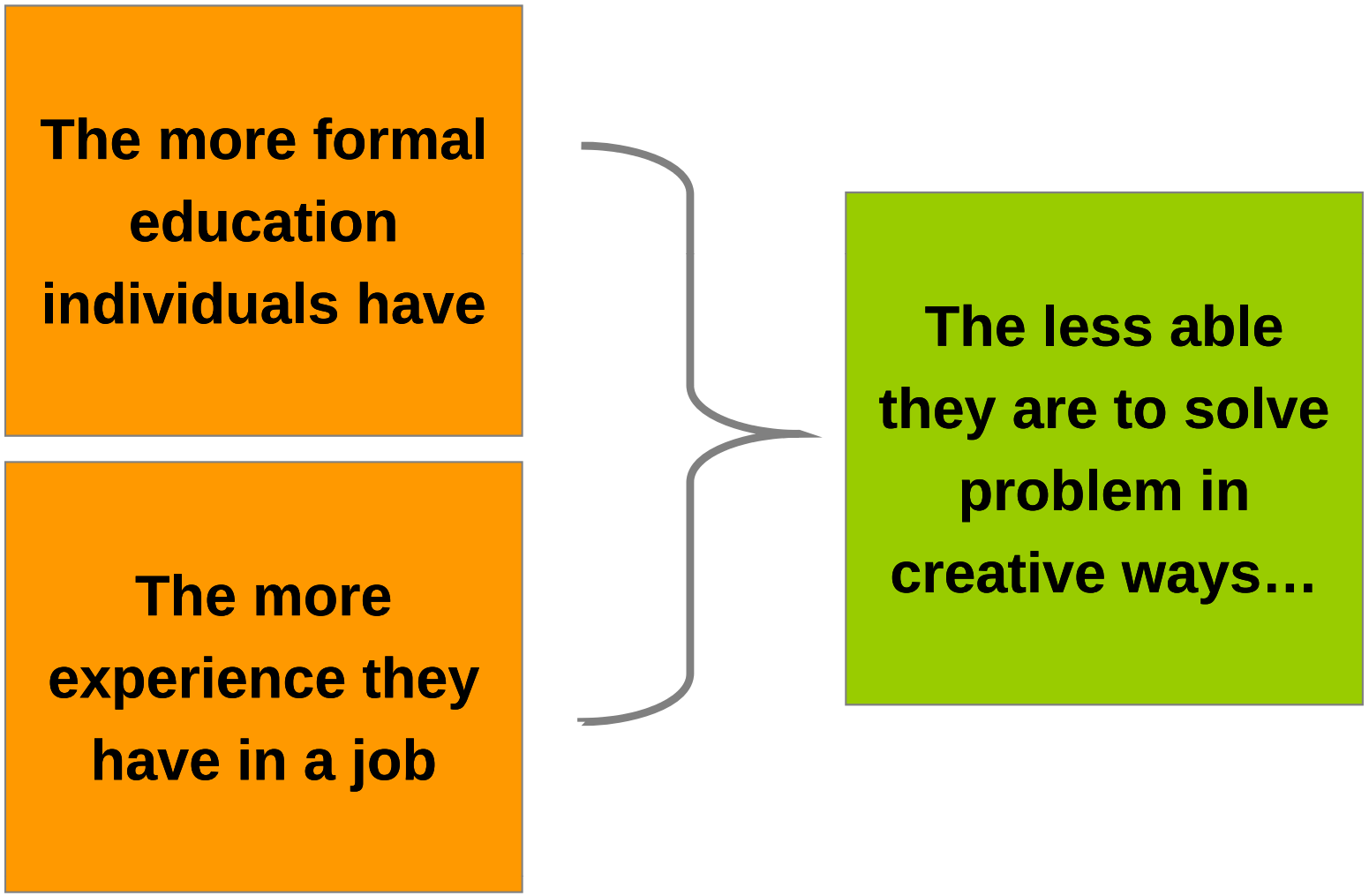


Conceptual Blocks

Conceptual blocks

Mental obstacles that constrain the way the problem is defined and limit the number of alternative solutions thought to be relevant

Conceptual Blocks



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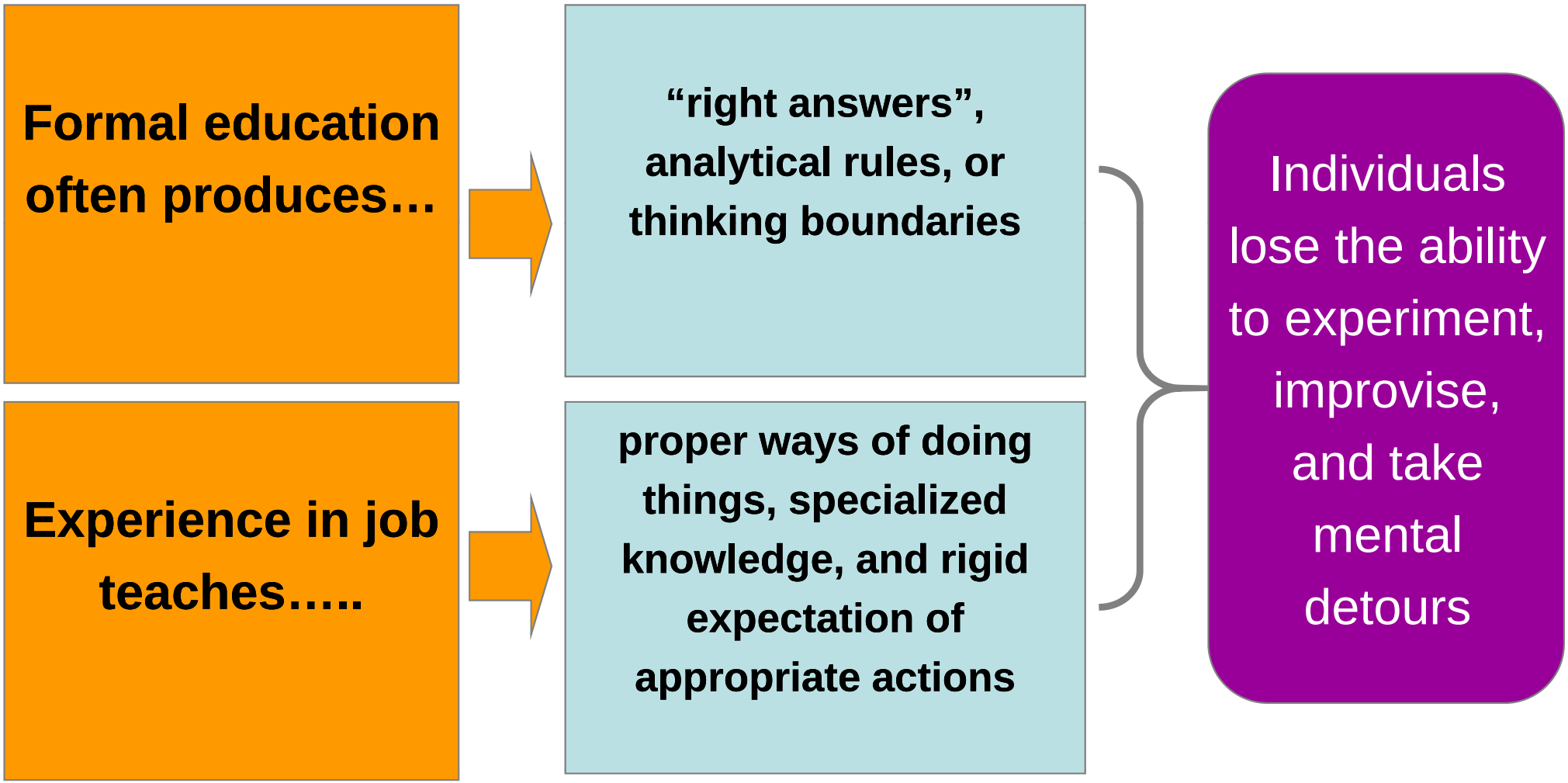
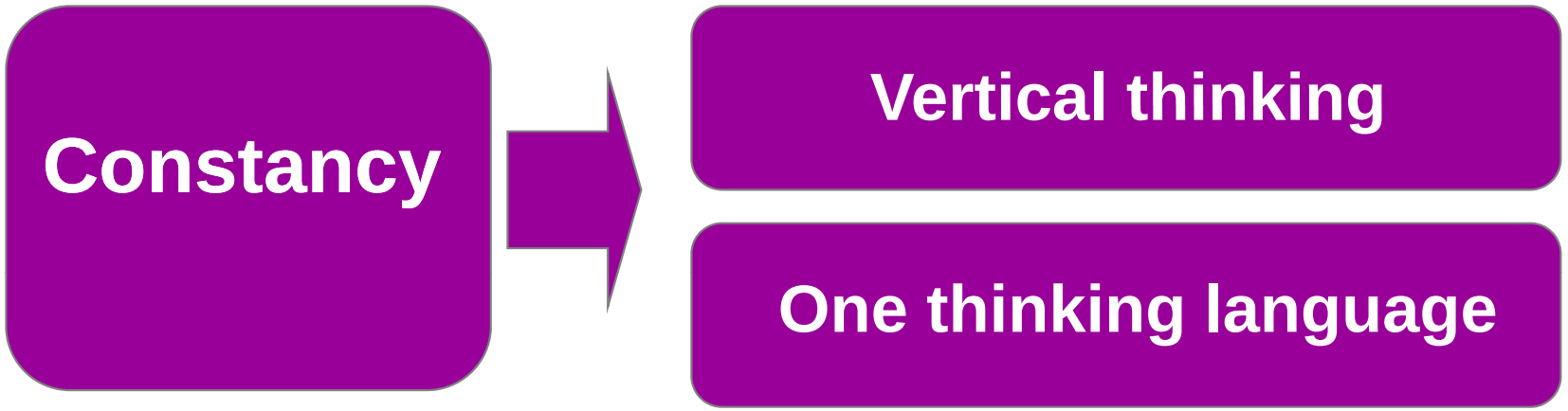
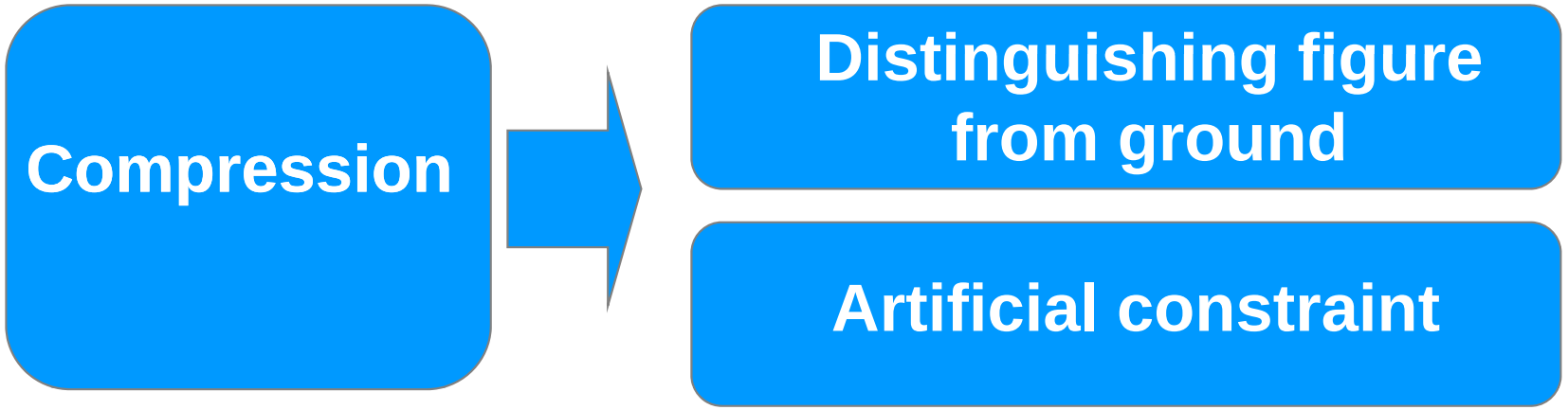


Types of Conceptual Blocks





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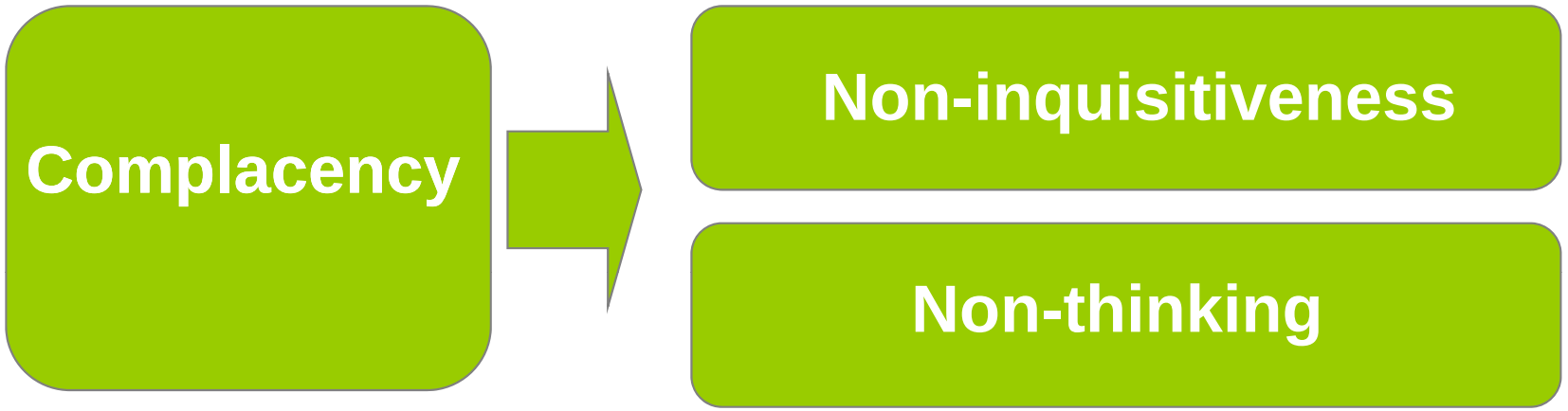


Constancy

Vertical thinking

- Defining problem in only one way without considering alternative views
- Lateral thinkers, on the other hand, generate alternative ways of viewing a problem and produce multiple definitions

One thinking language

- Using only one language (e.g., words) to define and assess the problem
- Disregarding other language such as nonverbal or symbolic languages (e.g., mathematics), sensory imagery (smelling), feelings and emotions (fear, happiness) and visual imagery (mental pictures).

Compression

Distinguishing figure from ground

- Not filtering out irrelevant information or finding needed information
- The inability to separate the important from the unimportant, and to appropriately compress problems.

Artificial constraints

- Defining the boundaries of a problem too narrowly
- People assume that some problem definitions or alternative solutions are off-limits, so they ignore them.

Complacency

Non-inquisitiveness

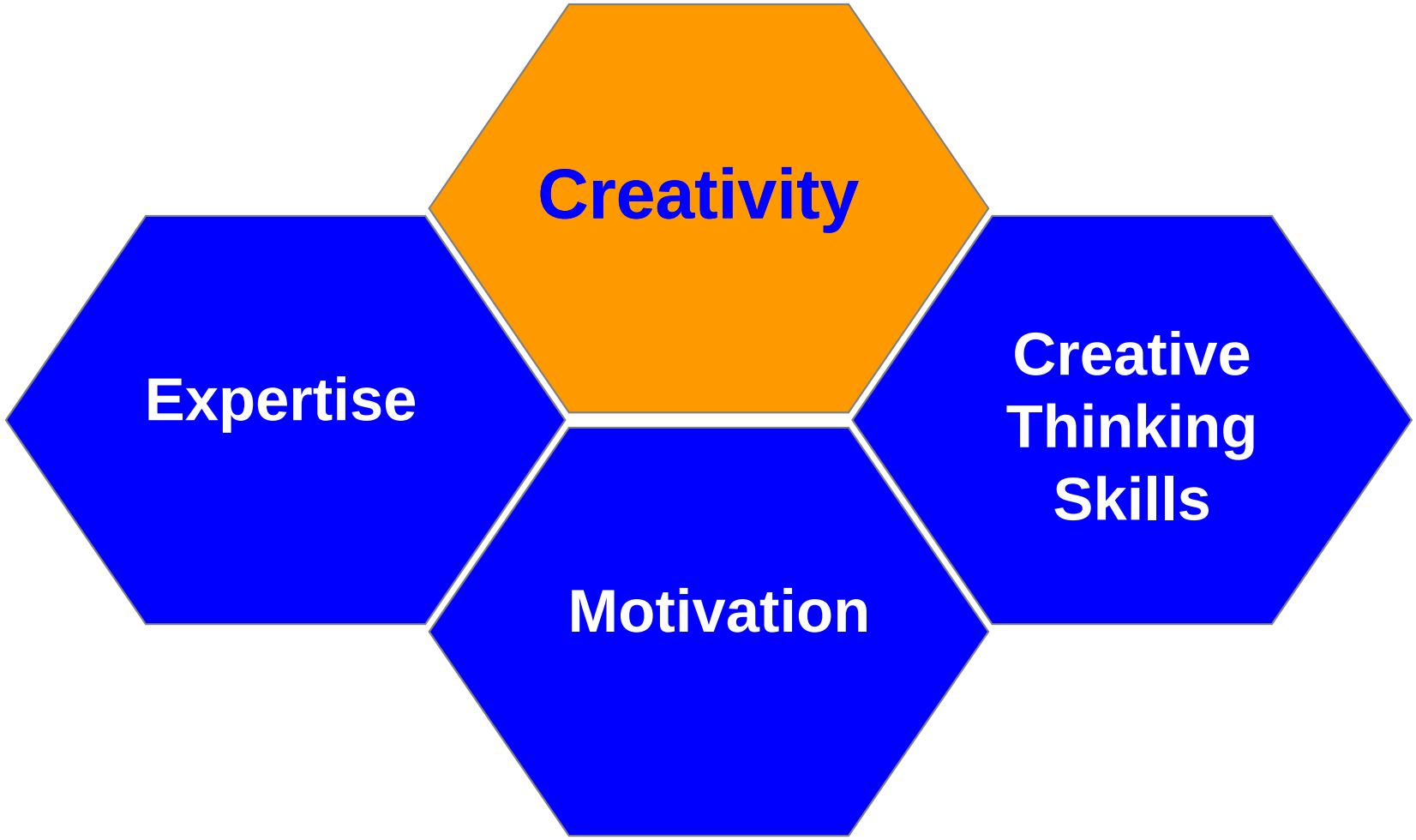
- Not asking questions
- Sometimes the inability to solve problems results from a reticence to ask questions, to obtain information, or to search for data.

Non-thinking

- An inclination to avoid doing mental work.

Three Components of Creativity

Three Components of Creativity



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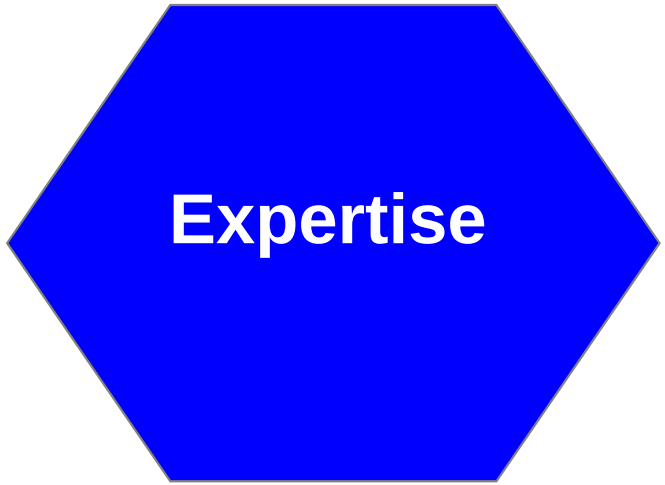


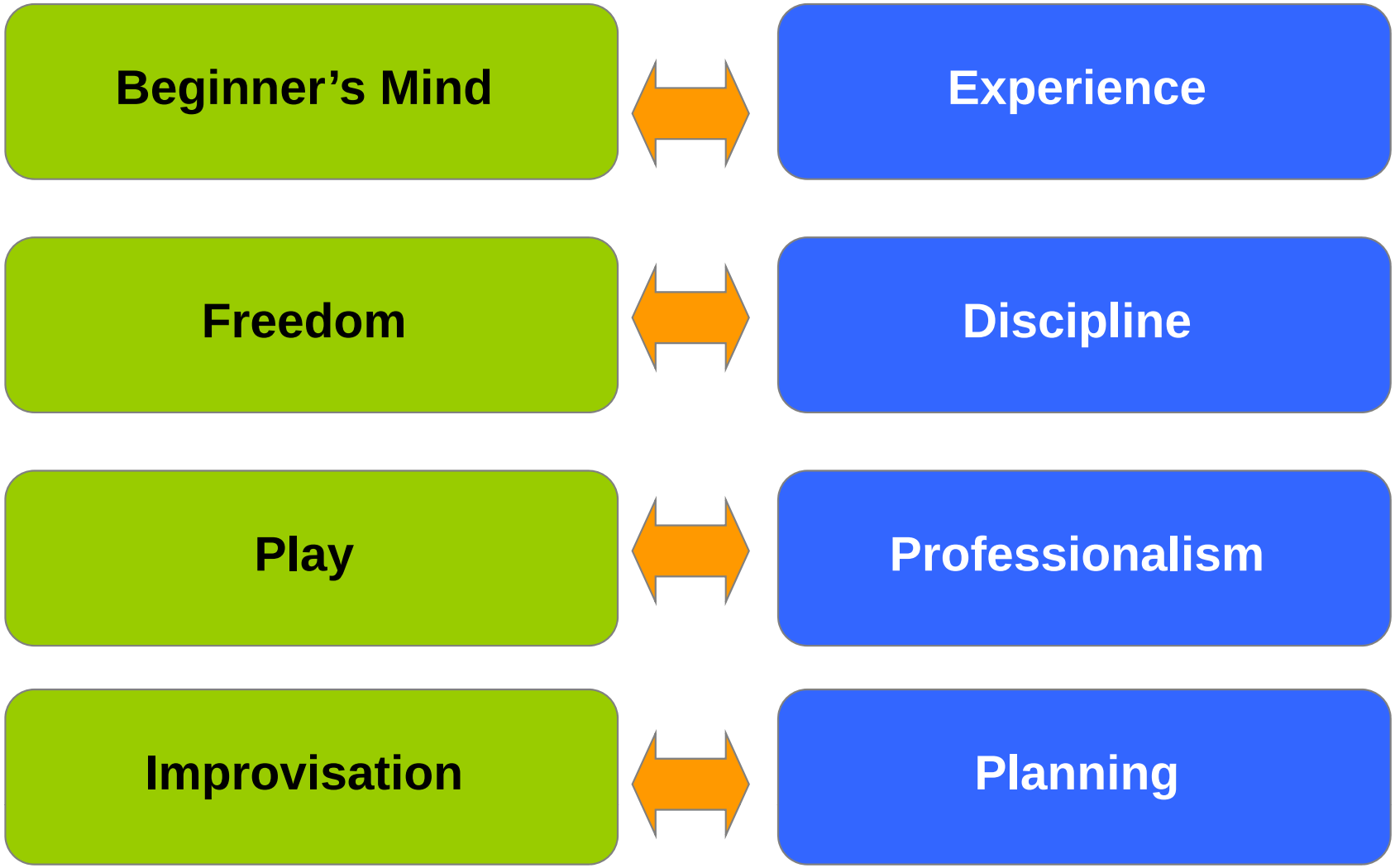
Expertise is, in a word, knowledge – technical, procedural, and intellectual

Not all motivation is created equal. An inner passion to solve the problem at hand leads to solutions far more creative than do external rewards, such as money.

Three Components of Creativity

Creative thinking skills determine how flexible and imaginatively people approach problems.

The Paradoxical Characteristics of Creative Groups



Myths about Creativity

1. The smarter you are, the more creative you are
2. The young are more creative than the old
3. Creativity is reserved for the few – the flamboyant risk takers
4. Creativity is a solitary act
5. You can't manage creativity

Tools for Defining Problems

Tools for Defining Problems

- Kipling Method
- Problem Statement
- Challenge Method

Kipling Method

Kipling Method

- Rudyard Kipling used a set of questions (5W + 1H) to help trigger ideas and solve problems
- One approach with this is to use the questions in a particular order to help guide you through a sequence of thought towards a complete answer, such as: *What is the problem? Where is it happening? When is it happening? Why is it happening? How can you overcome this problem? Who do you need to get involved? When will you know you have solved the problem?*

Kipling Method

Kipling Method

- Any questions work because we are conditioned to answer questions that we are asked. They challenge us and social rules say it is impolite not to reply.
- The Kipling questions work because they are short and direct. They are also largely general, and 'What' can be applied to many different situations, making them a flexible resource.

Problem Statement

Problem Statement

- When starting to solve a creative problem it is a good idea to define the problem you are trying to solve.
- Start by discussing the overall context and situation in which the creative activity is aimed.

Problem Statement

Problem Statement

- Write down more than one draft of the problem statement. Remember that defining the problem is almost a complete project in itself and you may benefit from going through iterative stages of convergence and divergence.
- Listen and write down everybody's opinion of what the problem really is. Find the points of agreement and then discuss the differences.

Problem Statement

Problem Statement

- Stating the problem may seem obvious, yet many creative efforts fail because the problem is either unclear or it is focused in the wrong place.
- The way you state a problem is half the problem and half the solution. Once you have identified a good problem statement, sometimes the solution is so obvious that you need little, if any, creative thought afterwards.

Challenge Method

Challenge Method

- Use it to force yourself or other people out of a thinking rut.
- Use it to test out ideas for validity.
- Use it to challenge the problem or situation you are considering when initially defining the problem.

Challenge Method

Challenge Method

- Select all or part of the problem domain that you are going to challenge. Perhaps it is something that has been particularly difficult to be creative around.
- Find something to challenge and question it deeply. You can challenge many things, including:
  - *Concepts - and broad ideas*
  - *Assumptions - and beliefs that are not questioned*

Challenge Method

Challenge Method

- *Boundaries - across which you do not yet cross*
- *'Impossible' - things that are assumed cannot happen*
- *'Can't be done' - things that are assumed cannot be done*
- *'Essentials' - things that you assume cannot be disposed of*
- *Sacred cows - that cannot be challenged*

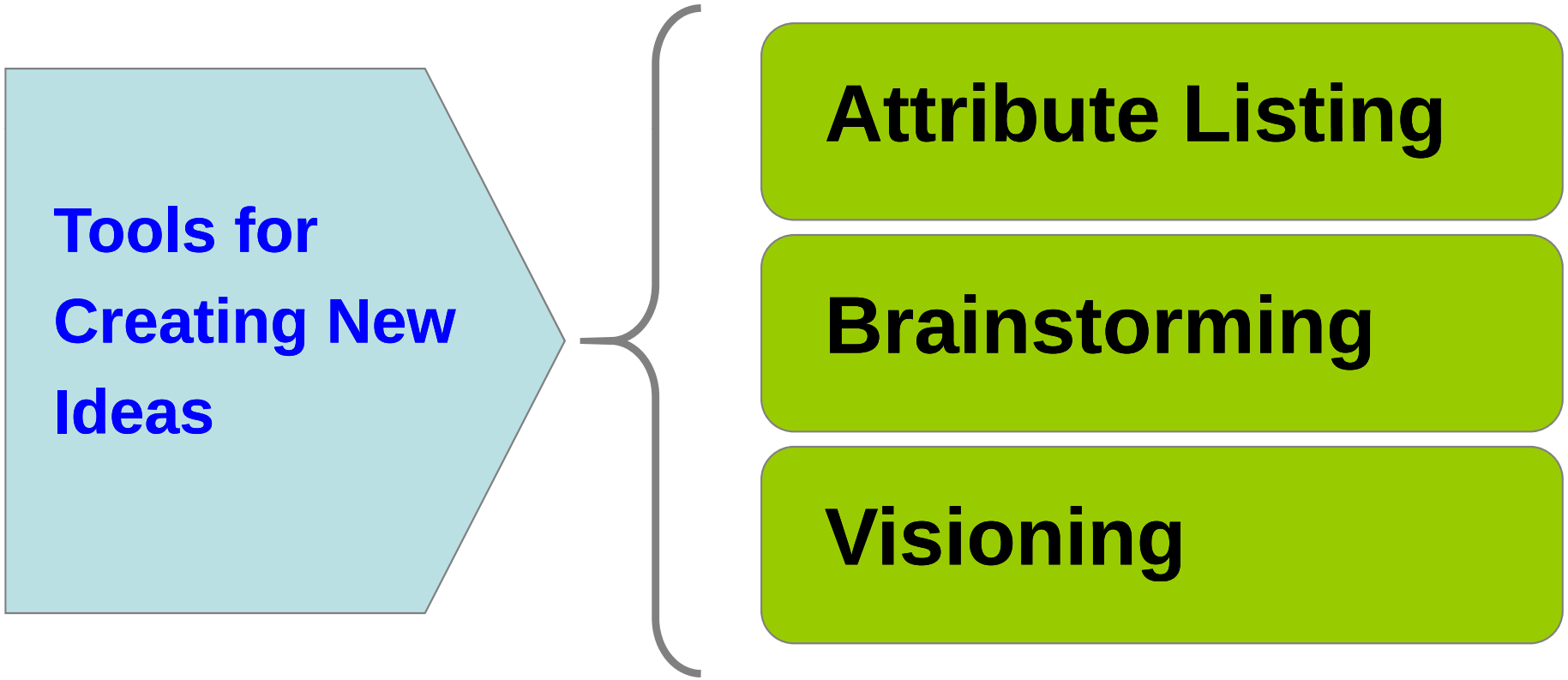
Challenge Method

Challenge Method

- One way in which we deal with the complexity of the world is to make assumptions about many things. Our pattern-matching ability is a great help in allowing us to take short-cuts but it often ends up in us not noticing many things.
- If we do not take deliberate and conscious action, our subconscious will let many assumptions pass by unnoticed.

Tools for Creating New Ideas

Tools for Creating New Ideas



Attribute Listing

Attribute Listing

- Use Attribute Listing when you have a situation that can be decomposed into attributes - which itself can be a usefully creative activity.
- Particularly useful with physical objects. You can use it elsewhere, too.
- Highly rational style. Suitable for people who prefer analytic approaches. Good for engineering-type situations.

Attribute Listing

Attribute Listing

- For the object or thing in question, list as many attributes as you can.
- It can also be useful to first break the object down into constituent parts and look at the attributes of each part in question.

Attribute Listing

Attribute Listing

- For each attribute, ask 'what does this give'? Seek the real value of each attribute. It is also possible that attributes have 'negative value' -- i.e.. they detract from the overall value of the object.
- Finally look for ways in which you can modify the attributes in some way. Thus you can increase value, decrease negative value or create new value.

Attribute Listing

Attribute Listing

- Attribute Listing works as a decompositional approach, breaking the problem down into smaller parts that can be examined individually.
- All things have attributes which are sometimes overlooked. By deliberately focusing on these, you can find new ways to be creative.

Brainstorming

- Brainstorming is probably the best-known creative tool.
- It can be used in most groups, although you will probably have to remind them of the rules.
- It is best done using an independent facilitator who manages the process (so the group can focus on the creative task).
- Typically takes around 30 minutes to an hour.

Brainstorming

- **Brainstorming Rules :**
  - *No criticism or debate*
  - *Quantity over quality*
  - *Freewheel*
  - *Combine and improve*

Brainstorming

- Brainstorming works when people use each other's ideas to trigger their own thinking. Our minds are highly associative, and one thought easily triggers another.
- If we use the thoughts of others, then these will stop us getting trapped by our own thinking structures.

Visioning

Visioning

- A vision is a 'motivating view of the future'. It creates pull. It gives direction.
- Imagine brilliant and innovative future. Think about what you are trying to achieve.
- Go out into the future. Look around and see what is there.

Visioning

Visioning

- Use dynamic and emotive words to paint motivating pictures. Use words like 'sharp', 'now' and 'value'.
- Phrase it in the present tense to make it more immediate. Use 'is' rather than 'will'.
- Use active verbs that talk about what is happening.
- Test it with others to ensure it works for them too.

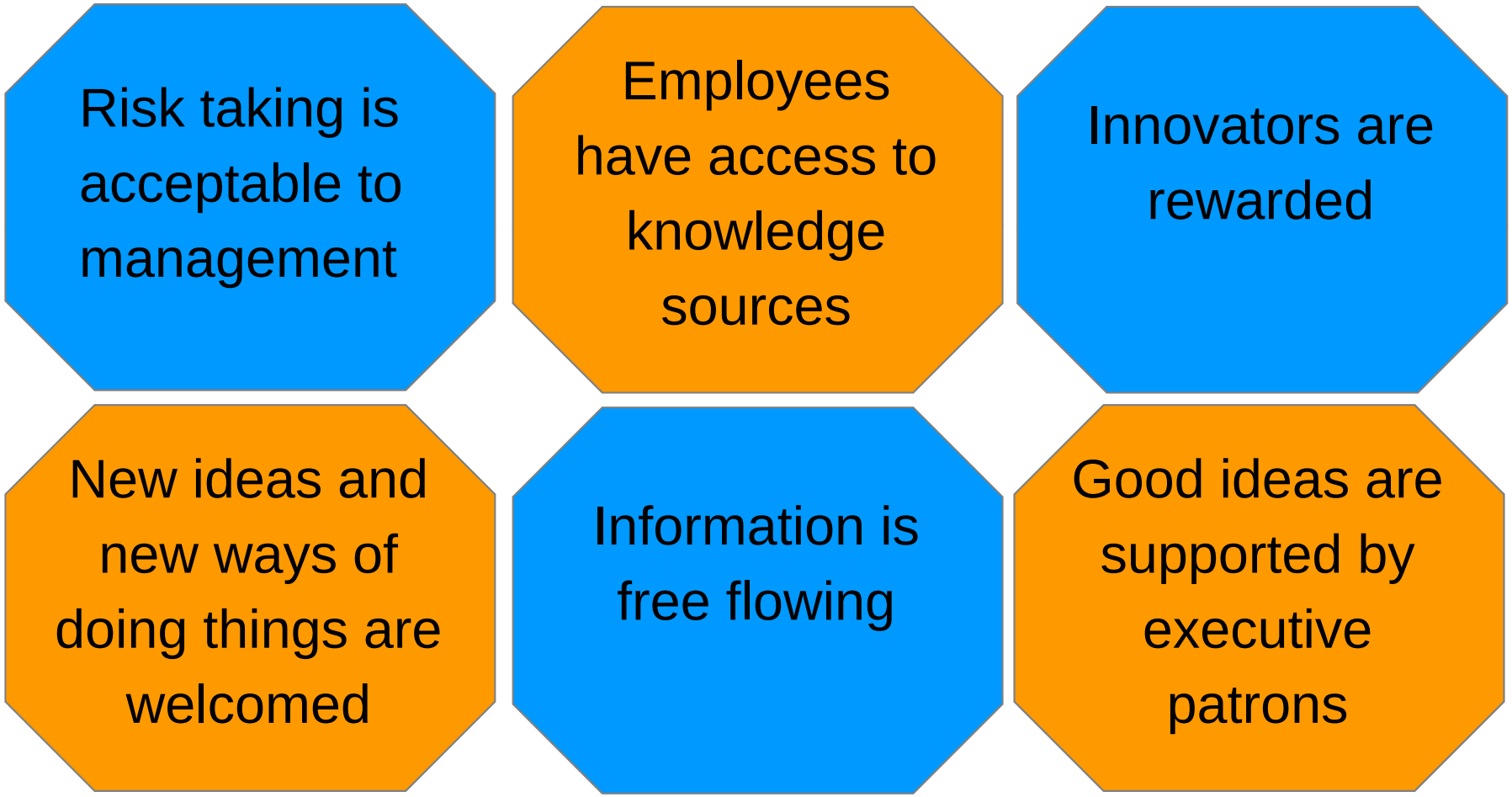
Visioning

Visioning

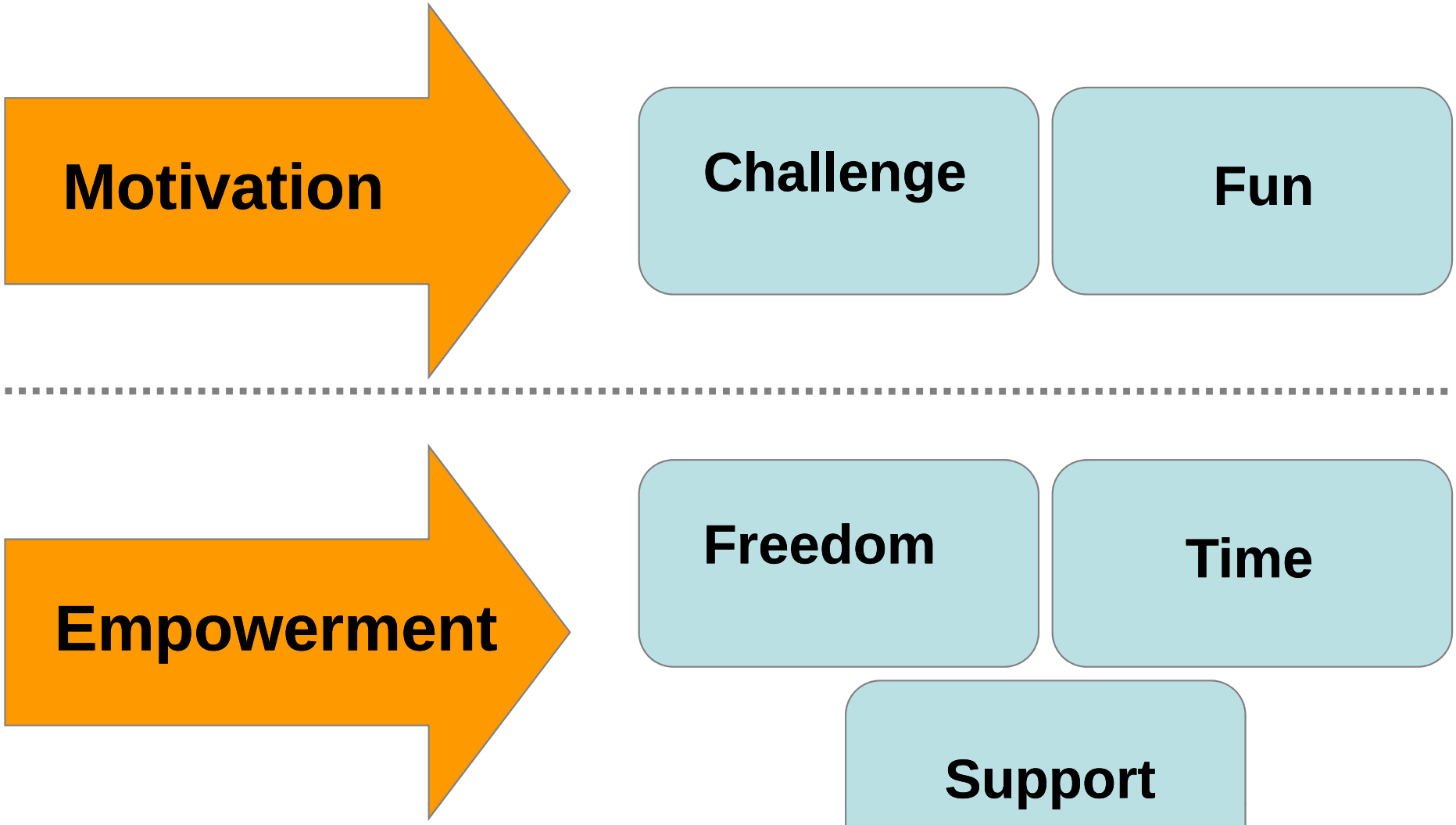
- Visioning works because we are an imaginative species and are motivated by what we perceive as a possible or desired future.

Creating a Creative Climate

Organizational Characteristics that Support Creativity and Innovation



Creating a Creative Climate



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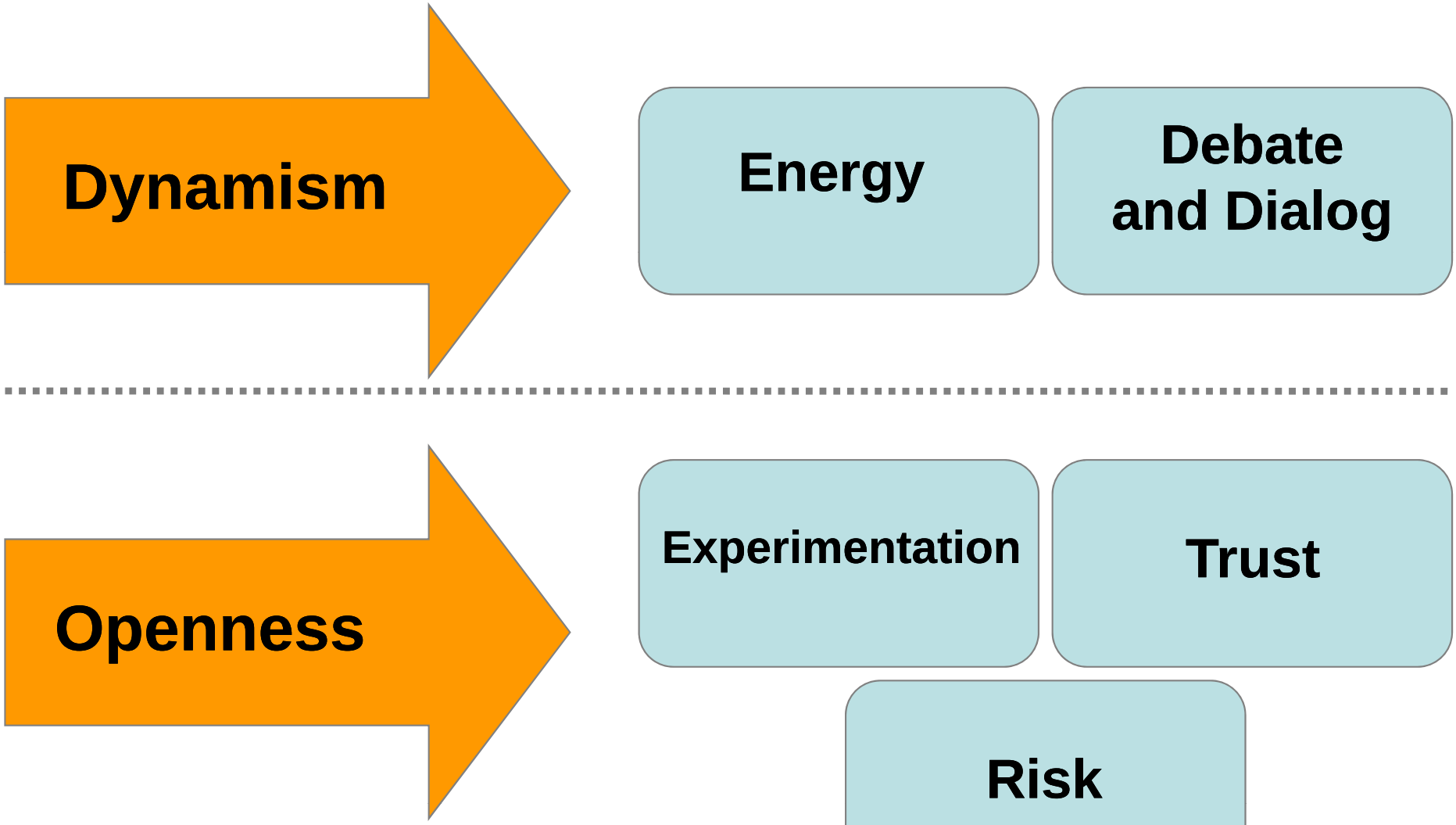

Recommended Further Readings:

1. David A. Whetten and Kim S. Cameron, *Developing Management Skills*, Harpers Collins Publisher
2. Floyd Hurt, *Rousing Creativity*, Crisp Publication
3. Carol K. Goman, *Creativity in Business*, Crisp Publication
4. www.creatingminds.org

End of Material