



كلية الهندسة
جامعة الملك سعود



King Saud University
College Of Engineering



GE105: Introduction to Engineering Design

Creativity

“Thinking Outside the Box”

Dr. Mohammed A. Khamis

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**“Nothing is more dangerous than
an idea when it is the only one we
have”**

Emile Chartier
French Philosopher, metaphysics
1868-1951



**“The best way to get a good idea is
to get a lot of ideas”**

Linus Pauling, 1901-1994
Chemist, Nobel prize winner
Nobel peace prize



What is Creativity?

- It is both an art and a science that is doing things in “non - normal” way
- Possible replacement words to Creative?
novel ; **unique**;
new; **innovative**;
different; **imaginative**;
non-typical;
unusual



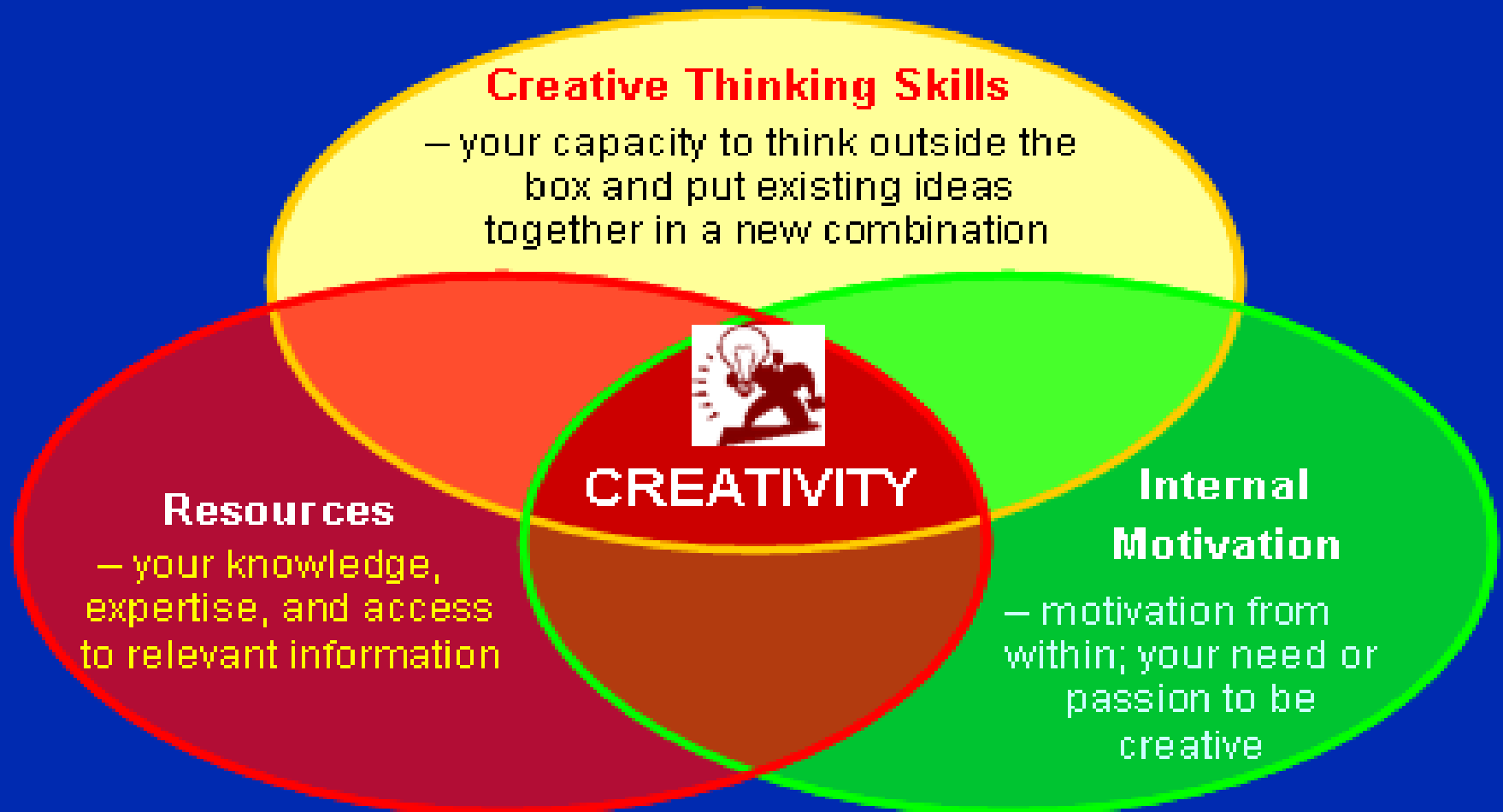
Unusual

What is Creativity?



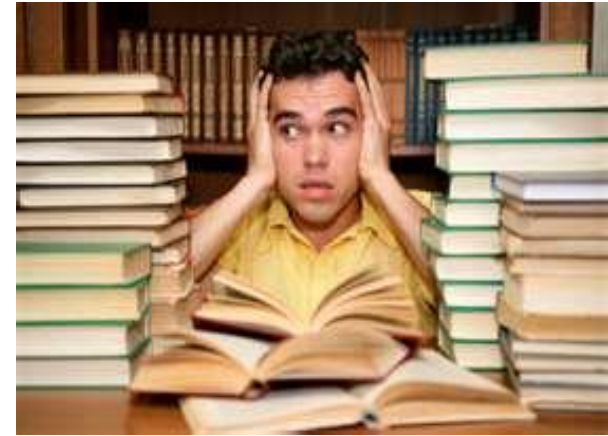
Creativity in Individuals

A Function of Resources, Motivation, & Creative Thinking



Creativity

- Advantages of being creative
 - generally able to cope (manage)
 - develop new understanding
 - become more adaptable
 - able to survive
- Disadvantages of being creative
 - thought to be a societal (group) misfit
 - often treated as being strange
 - often misunderstood
 - expression can often be suppressed



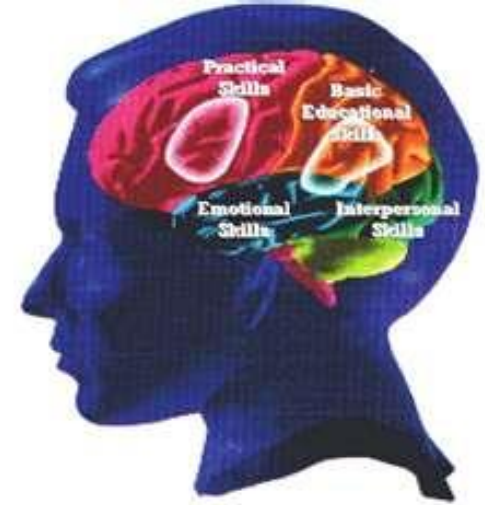
Coping



Creativity

- **Humor is an indicator of creativity**

- Intersection of several planes of experience
- Thoughts jump from one context to another
- Related to intelligence



Intelligence Centers

- **Sources of creativity**

- a new look at an old problem
- asking questions that are difficult to answer
- preparing for the unexpected
- “thinking outside the box”



Blocks to Creativity: Mental Locks

Attitudes that prevent you from
“seeing things differently”

- There is one right answer
- That is not logical
- Follow the rules
- That is not my area
- Don't be foolish
- To err is wrong
- I am not creative

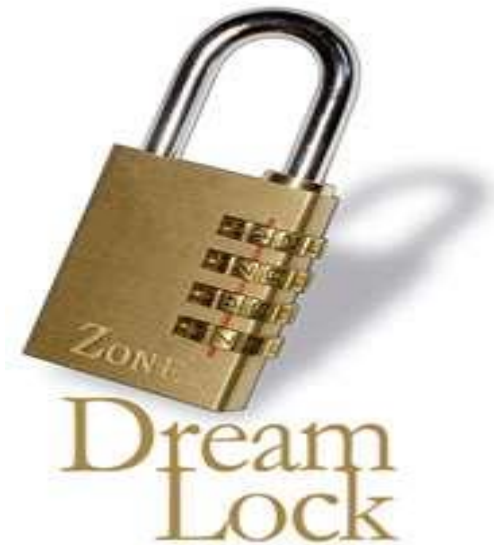


**Attitudes
are the Real
Disability**

Mental Unlocks

Some mindset tips

- Anything you can think of.
- Work when your mind is fresh.
- Work fast and short periods.
- Focus.
- Push hard.
- Have fun.
- No fear.



The Main Block to Creativity?

!!! Premature Judgment !!!!

- New idea could be rather weak
- Needs nurturing
- Must respect new ideas



**Nurturing
New Ideas**

Creativity as a Process

Preparation

Collecting background information & Focusing on the problem or opportunity



Incubation

After reviewing and processing information you sleep on it!



Illumination

Often when least expected an idea will flash into your mind. Eureka!



Implementation/Verification

Develop a plan to implement the idea and test.

Invention as a Process

If creation is the
development of new
ideas
then

invention is the
development of a new
device/product/
System/process.



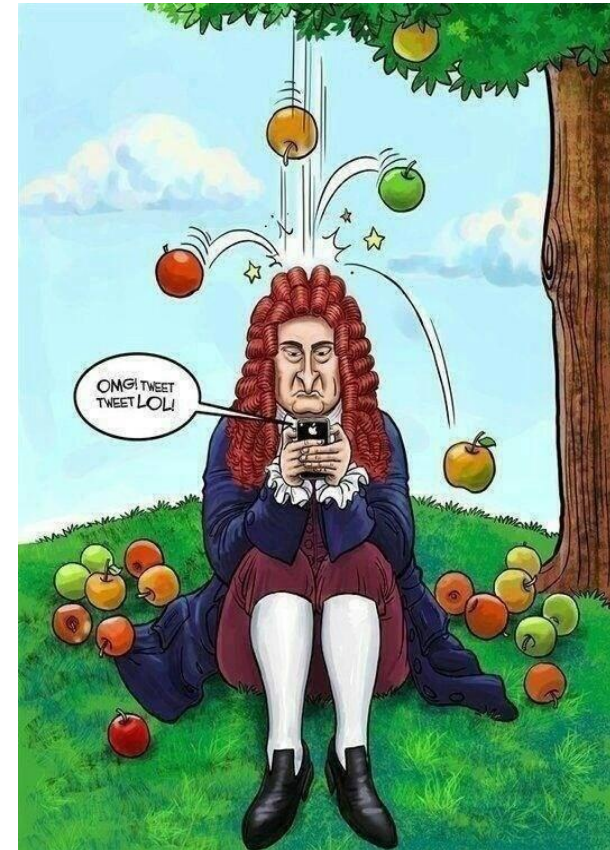
Creative People

- Are flexible
 - variety of approaches
- Are able to visualize
 - not limited to just words and symbols
- Are curious and humorous
 - continually ask questions and express emotions (through humor)
- Are comfortable with complexity
 - not easily overwhelmed (overcome)
(affect someone's emotions in very powerful way)



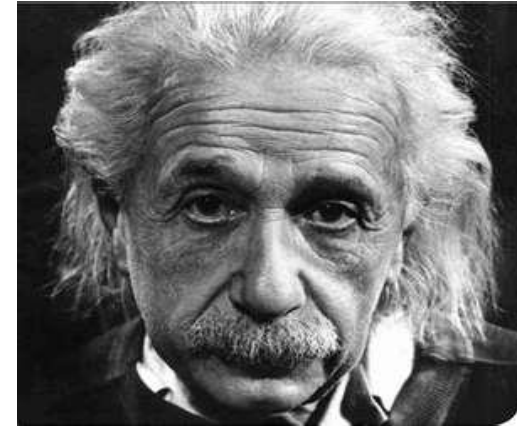
Creative People

- Are aware
 - Aware of the important aspects around them (Newton)
- Can conceptualize and recall
 - Interested in concepts rather than details
- Have discipline and self-confidence
 - self-motivated and unwavering
(strong and steady despite opposition)
- Are adaptable and resilient
 - undaunted (determined and not afraid to continue) by defeat

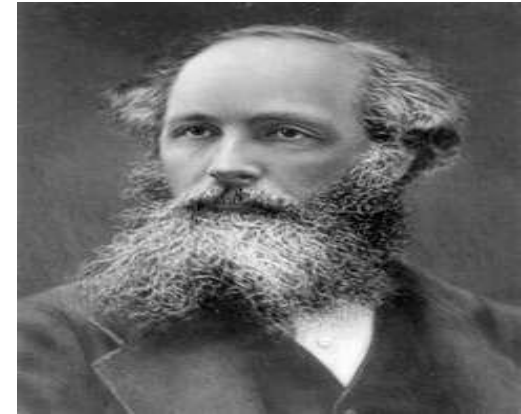


Creative People

- Have mental agility (able to move quickly and easily)
 - can fantasize and are intellectually playful
- Are skeptical (having doubts about something that other people think is true or right) of accepted ideas
 - less conservative than the average
- Are informal (relaxed and friendly)
 - are able to work anywhere
- Achieve fulfillment
 - recognition and honor/not driven by money



Albert Einstein



James Clerk Maxwell

Some Final Thoughts

“To understand creativity it must be experienced”

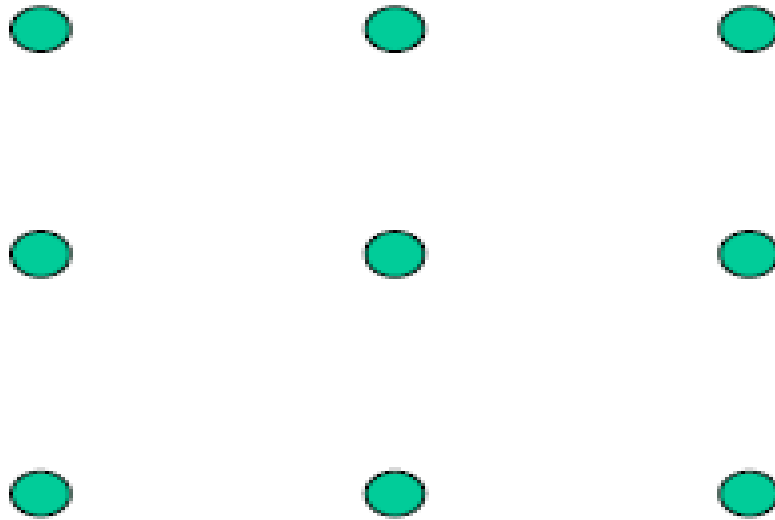
Hints to becoming more creative

- hangout with creative people
- practice mental drawing
- keep a journal (eg. daily notes)
- keep an open mind
 - practice using intuition- six sense; feeling
- have a positive attitude
- try new things
- exercise your freedom
- “Think Outside the Lines/Box”



Creativity - Lateral Thinking

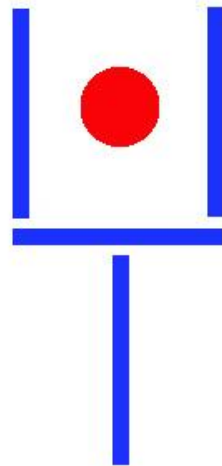
Connect all 9 points with only 4 straight lines
(Without raising the pen)



<http://www.youtube.com/watch?v=epR-NvH6YLE>

The shovel problem

Think of this as a shovel and the coin on the spade. Move just two sticks so that the coin is no longer in the spade, but there still a shovel.



The shovel problem

Solution

