

Critical Thinking VS Problem Solving

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Lecture 5

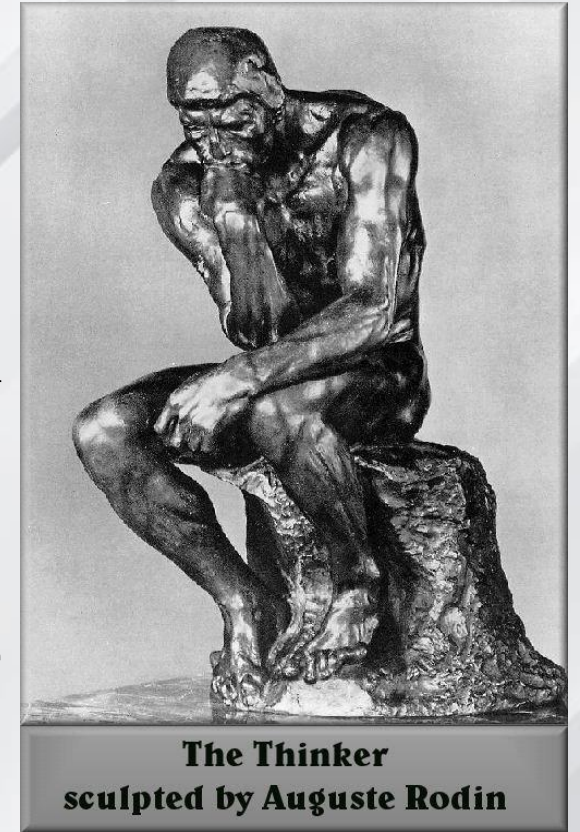


Critical Thinking

Communication Vs. Conflict

Interpersonal Conflict: This is conflict occurs between two or more individuals. It may stem from personality clashes, differing values, competing goals or mutual interferences in performing tasks.

Intragroup Conflict: This type of conflict takes place within a group or team.



I think, therefore I am.-
Rene Descartes

Communication has a big role to play in conflict management.

Our communication must be clear and precise to avoid conflicts.

First yourself be very clear what you intend to convey to the other individual.

The thoughts must be carefully put into sensible and relevant words for the others to understand well.

This exercise called

THINK

What are five main communication techniques available in conflict resolution?

5 Conflict Resolution Strategies We All Use

Kenneth Thomas developed five conflict resolution strategies that people use to handle conflict, including

1. avoiding,
2. defeating,
3. compromising,
4. accommodating
5. collaborating.

This assumes that people choose how cooperative and how assertive to be in a conflict.

What is critical thinking?

Not being content with the first solution to a problem but thinking more •
deeply about it.

Knowing, understanding, analyzing, synthesizing, applying and •
evaluating the idea or problem

Looking for what is implied in a question rather than what is stated •

Applying the rules of logic to problem solving •

Not letting reason be clouded by emotion •

Four Aspects of Critical Thinking

Abstract Thinking: •

thinking past what your senses tell you

Creative Thinking: •

thinking “out of the box,” innovating

Systematic Thinking: •

organizing your thoughts into logical steps

Communicative Thinking: •

being precise in giving your ideas to others.

Critical Thinking: What is involved?

Question: what is being asked? •

Purpose: why do I want the answer? •

Point of View: where do I stand to look at the question? •

Information: what data do I have? •

Concepts: what ideas are involved? •

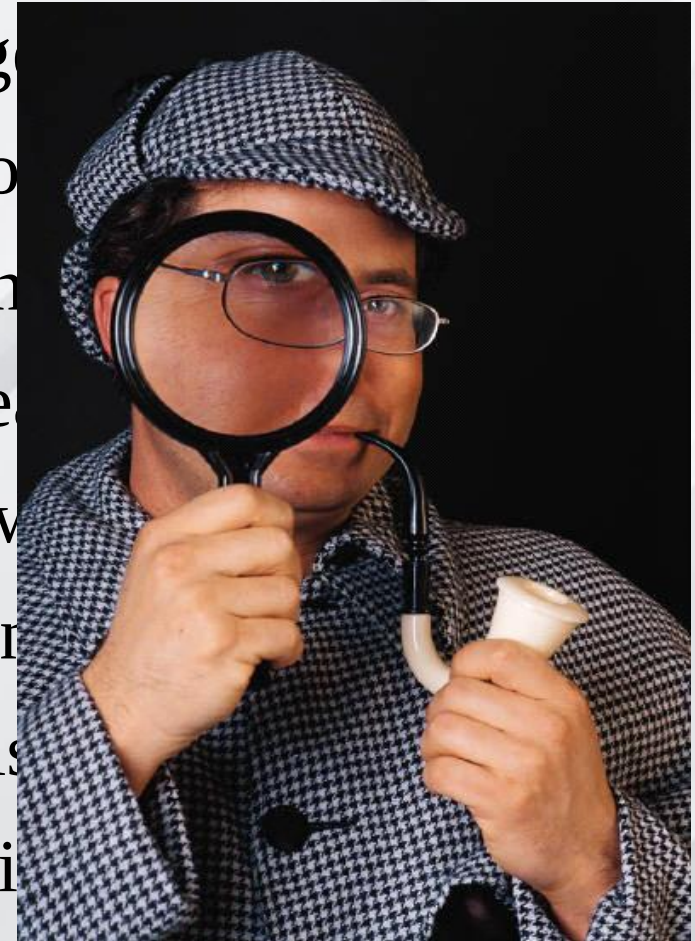
Assumptions: what am I taking for granted? •

Inferences: what conclusions am I drawing? •

Consequences: what are the implications of my question? •

Critical Thinkers

- Acknowledge personal limitations.
- See problems as exciting challenges.
- Have understanding as a goal.
- Use evidence to make judgments.
- Are interested in others' ideas.
- Are skeptical of extreme views.
- Think before acting.
- Avoid emotionalism.
- Keep an open mind.



Uncritical Thinkers

Pretend to know more than they do. o

Get annoyed by problems. o

Are impatient. o

Judge on first impressions and intuition. o

Focus on their own opinions. o

Look only for ideas like their own. o

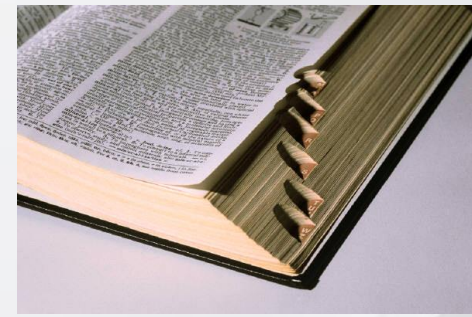
Are guided by feelings rather than thoughts. o

Claim that thinking gives them a headache. o

Don't think
about it,
just sign it!



A Thinker's Dictionary



Inference	A judgment based on evidence
Plausible	Logical and believable, credible
Validity	Truthful, well-founded
Claim	To assert as a fact whether it is or not
Fact	A truth that cannot be disputed
Opinion	A personal view or belief
Argument	A set of claims to support an assertion
Assumption	An inference that is believed to be true

The **IDEAL** Method

Identify the problem

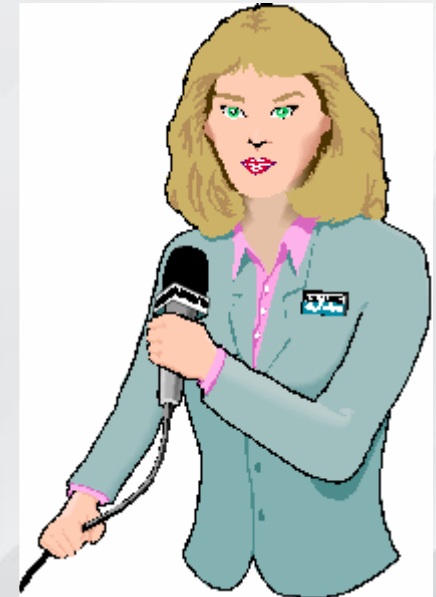
Define the problem

Explore alternative approaches. •

Act on the best strategies. •

Look back to evaluate the effects. •

Yes, ladies and gentlemen, it's **IDEAL!**



Ask Questions



One quality of a good critical thinker is the ability to ask on-target questions. •

If you don't usually ask questions, is it because you •

Fear embarrassment? •

Worry what others will think of you? •

Worry that the instructor will think your question is strange? •

Worry that others will think you're showing off? •

When you don't ask questions, you sacrifice *your* education. •

If you don't take risks, you won't get the maximum benefit in developing your mind. •

There's No Such Thing as a Stupid Question (Usually)

There are *unwelcome* questions. 📎

Don't ask questions that detract from the momentum of the 📎
class.

Don't ask questions that focus more on self-concerns than on 📎
the needs of the class.

Don't ask questions that demonstrate you failed to pay 📎
attention.

Don't ask silly questions. 📎

Can I draw
you a
conclusion?
Well, can I?



Offer Criticism

You will most likely be asked to judge or evaluate issues in college. •

First decide whether you like what you are being asked to judge. •

Consider both positive and negative attributes. •

Use examples to support your judgment. •

Don't be intimidated by this kind of assignment; your instructors want •

you to develop your critical thinking skills.

Make the Right Inferences

You are constantly making inferences. •

Inferences are interpretations that you derive from processing cues in a •
situation.

A *plausible* inference is a judgment that is logical, and possibly accurate. •

Sometimes inferences become *assumptions*—something we believe to be •
true and act on as though it were.

Inferences can be tricky. It is easy to be wrong and you may operate on faulty •
assumptions until you are informed otherwise.

Four Common Decision-Making Problems

Snap decisions •

Don't jump to

Narrow

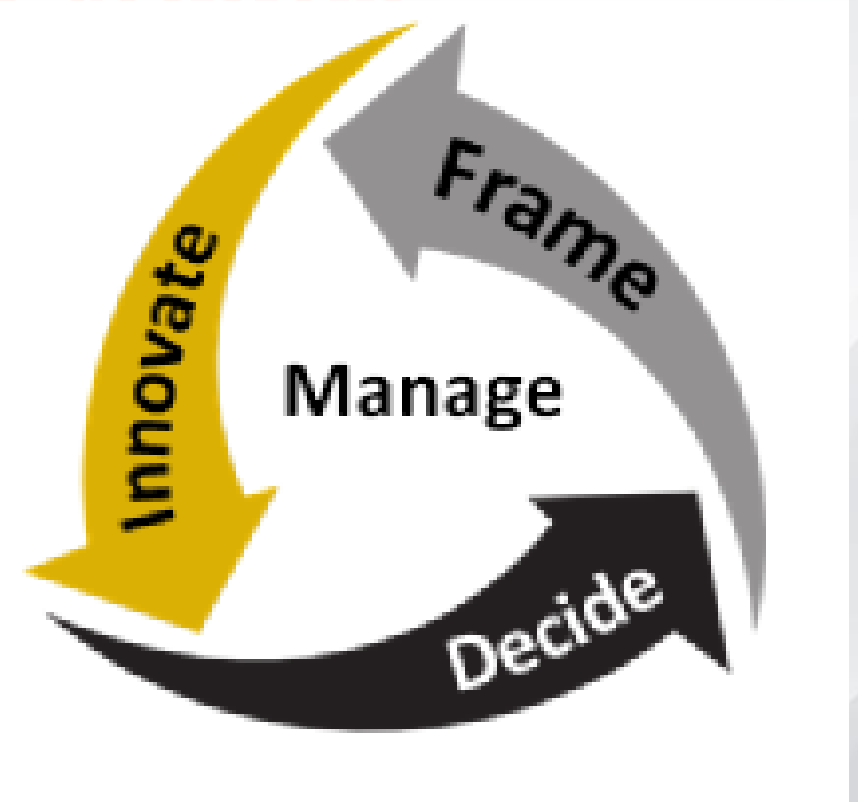
Broader

Sprawli

cover a large area of land w

Fuzz

confused and cannot think clearly.



What is a Claim?

- A *claim* is a statement which can be either true or false, but not both.
- A claim is an assertion you want to have accepted as a fact and not be disputed.
- When evaluating a claim, you have three choices:
 - accept the claim
 - reject the claim
 - suspend judgment until you have more information

I'm
stakin'
a claim!

What is an Argument?

- An *argument* is a set of claims.
- Arguments begin with *premises* and lead to a *conclusion*
- A good argument is one in which the premises lead logically to a *strong* or *valid* conclusion.



Form Strong Arguments

- Be sure the conclusion follows logically from the premises.
- Leave out faulty or dubious premises.
- Use precise language to pinpoint your claim.
- Avoid making claims you can't prove.



**All men from Mars are green.
Gork is from Mars.
Therefore, Gork is green.**

This is a perfectly logical argument (called a syllogism.)

It only has one small problem: NASA hasn't found any green men on Mars. Oh, well...

Know Your Own Biases

Everyone has strong preferences and prejudices •
that may prevent us from evaluating arguments
fairly.

Acknowledging these can increase the likelihood •
of producing more effective arguments.

Good reasoners guard against their own “soft •
spots” to increase their objectivity.

Be honest with yourself: “Am I opinionated? •



Refine Your Reasoning

- Be willing to argue
- Use deductive reasoning
- Check your assumptions
- Know your own limits
- Observe carefully
- Stay positive and persistent
- Show concern for accuracy
- Take time before concluding



What Makes a Creative Thinker?

- They actively pursue experiences that are aesthetically pleasing.
- They enjoy taking a unique approach to things.
- They love the process of creating.
- They are flexible and like to play with problems.
- They take risks and learn from their mistakes.
- They strive to evaluate their work fairly.
- They thrive when they think of assignment guidelines as a launching point for their imagination.



Da Vinci



Edison

Nurture Your Own Creativity

Don't accept other
Be vigilant about wh
Differentiate the
Take the plunge *before*
Concentrate



Motivate yourself from inside.

- Shape environments that will support your creativity. •
- Actively pursue your creative life. •

Critical Thinking: A Skill to Carry You Through Life

Professors and future employers value your ability to perform these critical thinking skills:

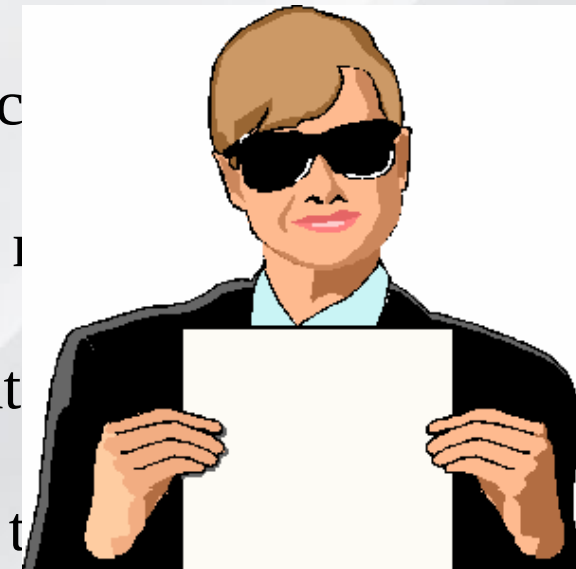
Manage and interpret information •
Examine exciting ideas and develop new ones •

Pose logical and c

Recognize i

Be proactive rat

Think things t



Why College Encourages Critical Thinking

Remember:

- Thinkers are generally “movers and shakers.”
- Sometimes how you solve a problem is as important as the solution.
- Open ended questions of “Why?”, “How?” or “What If?” have no simple, clear-cut answers.
- There are many valid points of view!
- The greatest gift a college can give you is an open mind.



Solving Problems

Problem-Solving Strategies



1. Draw a diagram.

“A picture is worth a thousand words.” •

Are you a visual learner? •

Turn an abstract problem into a concrete problem by •
making a sketch.

Example: Determine the order of the houses. •

Problem-Solving Strategies



2. Make a list.

A systematic listing of options/choices can make the •
answer clearer.

Use a methodical approach to cover all options/choices. •

Example: How many possible tile arrangements are •
there?

Problem-Solving Strategies



3. Trial and error

Sometimes known as “guess and check.” •

Good if the cost of a wrong guess is minimal. •

Good if the number of possible answers is not too large. •

Example: The product of five consecutive integers is greater than one million. What are the smallest values that do this? •

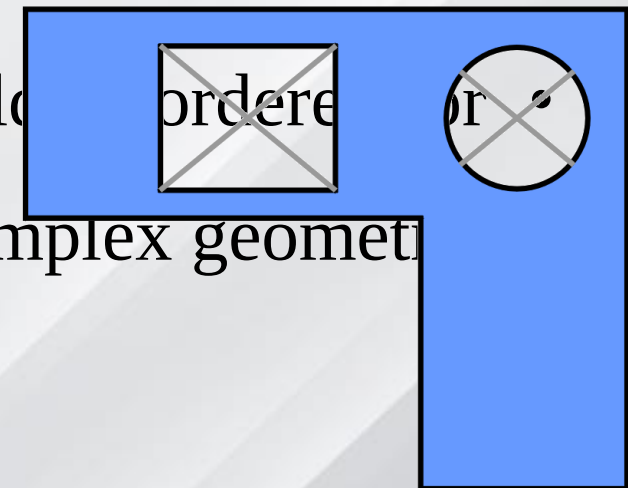
Problem-Solving Strategies



4. Divide and conquer.

Break big problems into several smaller problems that are more easily •
solved.

Example: How many tiles should be ordered for
a countertop with complex geomet



Problem-Solving Strategies



5. Look for a pattern.

Often other approaches yield a ***pattern*** that suggests a possible solution. Test the solution. •

Example: 1000 students have 1000 lockers. Starting at locker 0001, Student #1 • opens every locker. Student #2 closes every other locker. Student #3 changes every 3rd locker. Student #4 changes every 4th locker. And so on, through Student #1000.

What lockers will be left open?

Problem-Solving Strategies



6. Working backward might be useful when...

- The result is clear, but the initial conditions are not.
- The beginning situation is complicated, but the end is simple.
- The direct approach would involve a complicated equation.
- The problem involves a sequence of reversible actions.

Example: What was your previous month's bank balance if this month's statement shows •
\$493.18, after checks for \$17.73 and \$88.10, and a deposit of \$193.22 and interest of \$0.26?

Quality Improvement

Seven-Step Strategy for Quality Improvement



Identify and define the problem. .١

Brainstorming (a

Impact changeability tool (b

Problem statement (c

Study the current situation. .٢

Force-field analysis (a

Flow chart (b

Seven-Step Strategy for Quality Improvement



Find the root cause. .۳

Asking “why” five times (a
Fishbone diagram (b

Choose a solution. .۴

Brainstorming (a
Evaluation grid (b

Seven-Step Strategy for Quality Improvement



Develop and action plan. .°

Specific and clear —

Logical sequence —

Comprehensive —

Shared with whole team —

Reviewed frequently —

GANTT Chart

A type of bar chart that illustrates a project schedule



Illustrates the beginning and completion dates for sub-tasks within a project •

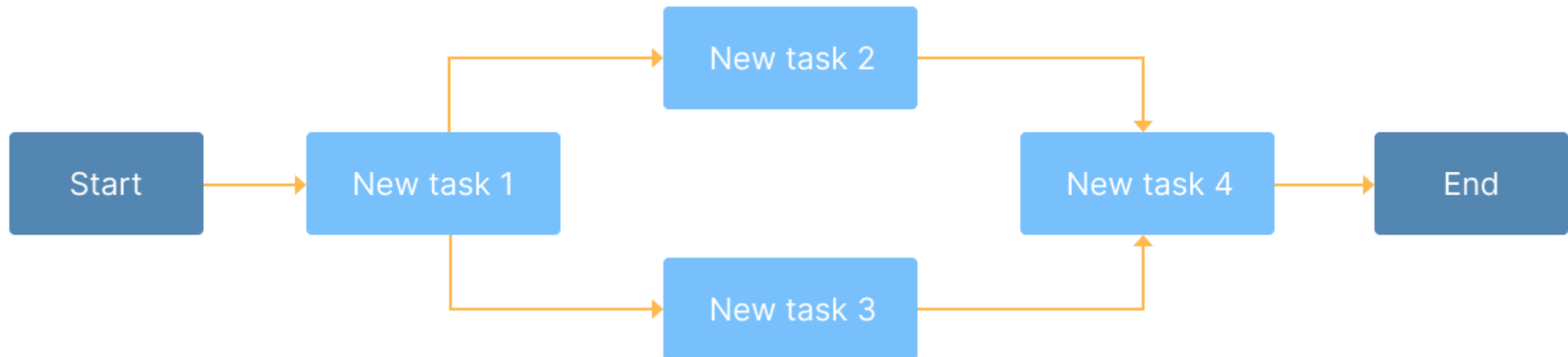
Task Name	Q1 2019			Q2 2019		Q3 2019
	Jan 19	Feb 19	Mar 19	Apr 19	Jun 19	Jul 19
Planning						
Research						
Design						
Implementation						
Follow up						

PERT Chart

a tool used to schedule, organize, and map out tasks within a project.



Project Evaluation and Review (PERT) shows the sequence of tasks in a project or problem-solving process •



Seven-Step Strategy for Quality Improvement



6. Implement the action plan.
Includes five Ws and one H:

- Who ✓
- What ✓
- Where ✓
- When ✓
- Why ✓
- How ✓

Seven-Step Strategy for Quality Improvement



Check the results. .✓

Force-field analysis (a

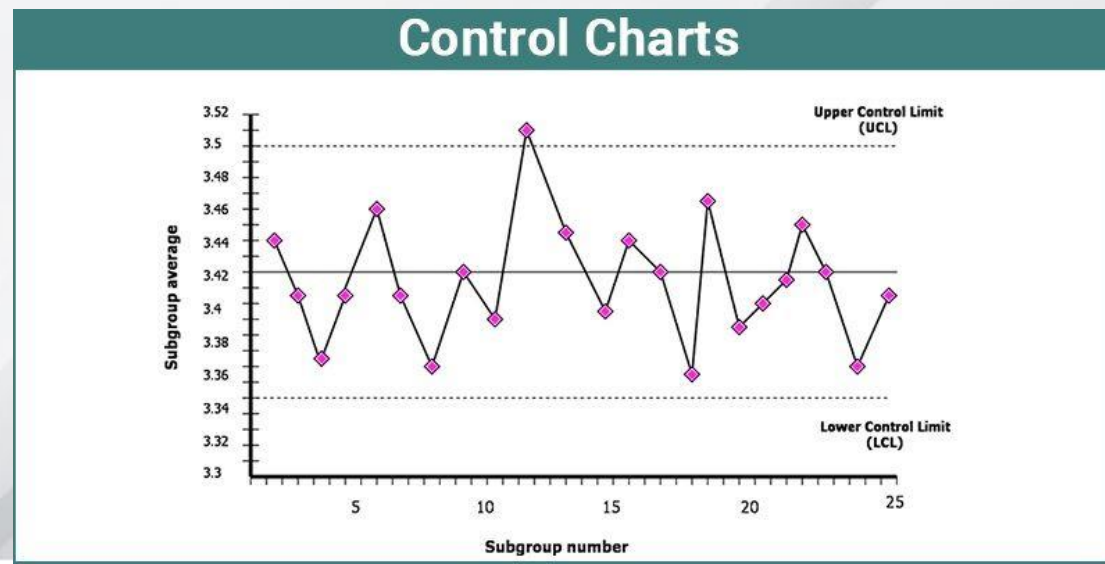
Brainstorming (b

Evaluation grid (c

Quality-Control Charting



In statistics, **Control charts** are the tools in control processes to determine • whether a manufacturing process or a business process is in a controlled statistical state. This chart is a graph which is used to study process changes over time. These charts are also known as Shewhart charts or process-behavior charts. The data is plotted in a timely order





Thank You