

GEO 309 – Intro to GIS

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Topics

- Project Planning
- Critical Thinking
- Structured Thinking
- Analytical Thinking

Project Planning

- **85% of GIS Projects FAIL:**
 - 87% go more than 50% over budget
 - 45% don't produce expected benefits
 - 90% go over schedule

Project Planning

- Project Definition
 - “Who, What, When, Where, Why, How?”
- Management Plan
 - What are “you” going to do?
 - How are “you” going to do it?

Project Planning

- Project Definitions
 - Detail to level of complexity
 - Set the scope of objectives
 - Delegate tasks and Scheduling
 - Performance benchmarks
- What do you need?
 - Objectives?
 - Partners?
 - Data (Store)?
 - Tools?
 - Skills?
 - Outputs?

Project Planning

- Management Plans
 - Costs
 - Risk management
 - Operations planning
 - Resources
 - Communications
 - Safety planning
 - Contingency planning
 - Quality assurance

- Risk Management
 - Identify
 - Evaluate
 - Estimate
 - Control
- Risk \neq Contingency

Project Planning

- Quality assurance
 - Part of quality management
 - Evaluation of performance/standardization
 - Ensure quality acceptance
 - Corrective actions
 - CI (Continuous Improvement)
 - Works with operations

Project Planning

- Communication
 - Very important!
 - Set by operations
 - GIS Manager/Senior GIS Analyst
 - Project Manager
 - Take copious notes
 - Share and share often (when possible)

Project Planning

Questions?

Critical Thinking

Questioning
Analyzing
Conceptualizing
Defining
Examining
Inferring
Listening
Reasoning
Synthesizing

Curiosity
Perspective
Knowledge
Skepticism
Responsibility

Evaluating our
Thoughts

Evaluating Information
In a
Structured way

Refining our
Thought processes

Create/Assess Information more Thoroughly
Better able to Identify/Reject Fallacies

Handle uncertainty
Alleviate Ignorance

Intellectual
Independence

Clear Expression
of Ideas

Individual Growth

Social Enrichment

Critical Thinking

- Why?
 - Taking time to “think critically” saves you time
 - Facilitates praxis in daily life
 - Skepticism
 - Falsification
 - Fallacy

Critical Thinking

- Deductive reasoning
 - Establish a hypothesis
 - Premises (statements) form an argument
 - A good argument supports the conclusion
 - Solid reasoning
- Inductive reasoning
 - Drawing conclusions from existing data

Critical Thinking

- Necessary Conditions
- Sufficient Conditions
- Backed by research
- Implicit Premises
 - Need examination/explanation
 - Embedded in culture, region, other geographies

Critical Thinking

- Descriptive Claims
 - Expressing an understanding or describing
 - Without a following evaluation
- Normative Claims
 - Statement of an evaluation
 - Without presentation of the rational (usually implicit)

Critical Thinking

- Must be aware of **Fallacy!**
 - ...the use of **poor reasoning** in order to **build an argument**
 - Does not necessarily mean the conclusion is false!
- **Many types**
 - Formal or informal (poor form or content in systemic logic)
 - Presumptive (conclusion is the proof)
 - Ambiguity (vague support)
 - And on and on...

Critical Thinking

- Considerations
 - Cognitive bias
 - Knowledge & evidence
 - Reasoning and assumptions
 - False dichotomy
 - Embodied metaphors

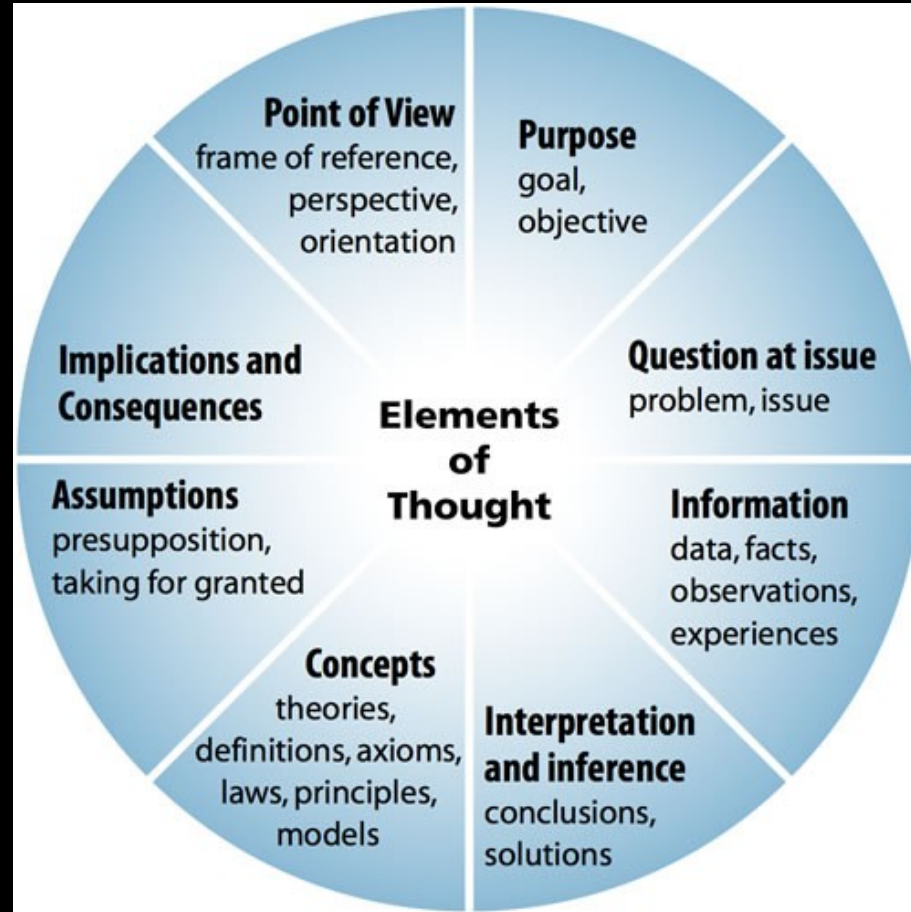
Critical Thinking

Questions?

Structured Thinking

- Deciding to think critically is the beginning
 - In order to make that process better
 - We have to find ways to analyze our thoughts
 - While eliminating/observing biases
- In order to analyze thought
 - We have to look at what composes thought
 - Understand the processes behind our reasoning
 - Establish ways by which to test and reassess thought
 - Find and Include newer data with each iteration
- Question everything

Structured Thinking



Source: Analytic Thinking by The Foundation for Critical Thinking

Intellectual Standards Are Used to Assess Thinking

Clarity

Could you elaborate further?
Could you give me an example?
Could you illustrate what you mean?

Accuracy

How could we check on that?
How could we find out if that is true?
How could we verify or test that?

Precision

Could you be more specific?
Could you give me more details?
Could you be more exact?

Relevance

How does that relate to the problem?
How does that bear on the question?
How does that help us with the issue?

Depth

What factors make this a difficult problem?
What are some of the complexities of this question?
What are some of the difficulties we need to deal with?

Breadth

Do we need to look at this from another perspective?
Do we need to consider another point of view?
Do we need to look at this in other ways?

Logic

Does all this make sense together?
Does your first paragraph fit in with your last?
Does what you say follow from the evidence?

Significance

Is this the most important problem to consider?
Is this the central idea to focus on?
Which of these facts are most important?

Fairness

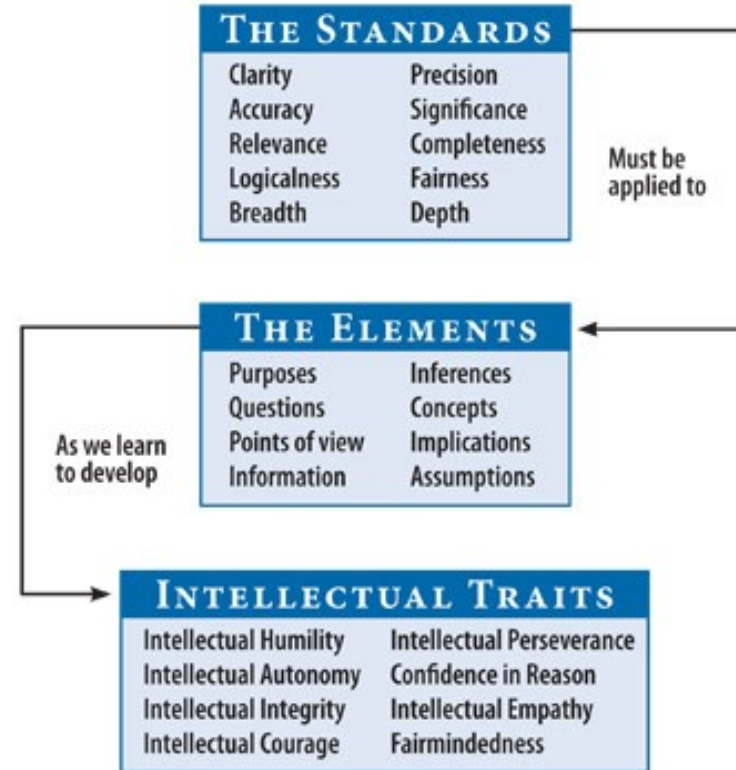
Do I have any vested interest in this issue?
Am I sympathetically representing the viewpoints of others?



The Foundation for Critical Thinking
800-833-3645 www.criticalthinking.org

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Critical Thinkers Routinely Apply Intellectual Standards To The Elements Of Reasoning In Order To Develop Intellectual Traits



Source:
Analytic
Thinking by
The
Foundation
for Critical
Thinking

Structured Thinking

- We do this to
 - Structure the problem
 - Overcome subconscious processes
 - Biases, perception, memory, processing
 - Prepare for paradigm shifts
 - The most knowledgeable of us have the most to unlearn
 - Keep you fresh
 - Over time, we become entrenched in daily activity
 - Memory changes over time
 - Fill the information gaps
 - Backed by strong logic and empirical data

Structured Thinking

Questions?

Analytic Thinking

- Caution!
 - Don't start with your conclusion; end with it
 - Look at alternate solutions
 - Let the analysis favor the solution; not you
 - Thinking is not analysis
 - Focus on the process of analysis
 - Not the substance
 - When in doubt, ask and ask again
 - Work hard to prove yourself wrong
 - Allow others to do the same
 - Your argument will become stronger

Analytic Thinking

- Problem Restatement
- Pros/Cons/Fixes
- Divergent/Convergent
- Sorting & Time Lines
- Causal Flow Diagram
- Matrix
- Decision Tree

- Weighted Ranking
- Hypothesis Testing
- Devil's Advocate
- Probability Tree
- Utility Tree
- Utility Matrix
- Advanced Utility Analysis