Introduction to Instructional Design

Identifying Subordinate Skills and Entry Behaviors:

Unit Design

Dr. Lloyd Rieber

The University of Georgia

Department of Instructional Technology

Athens, Georgia USA

Objectives

- Describe approaches to subordinate skills analysis including hierarchical, cluster, and combination techniques.
- Describe the relationship among the subordinate skills identified through subordinate skills analysis, including entry behaviors.
- Apply subordinate skills analysis techniques to steps in the goal analysis, and identify entry behaviors as are appropriate.
- Demonstrate how the processes of needs assessment, goal analysis, and subordinate skill analysis relate to one another.
- Conceptualize design at different levels, roughly corresponding to courses, units, and lessons.

Review of the ISD process covered so far…

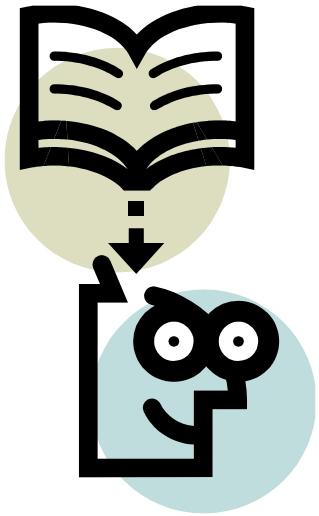
ADDIE Model

- Analysis
  - Is there a need for instruction?
  - What is the context?
  - Who are the learners?
- Design
  - “Blueprints” for courses, units, and lessons
- Development
  - Building something real from the blueprints
- Implementation
  - Trying out your materials
- Evaluation
  - Evaluating your design and making revisions

Macro

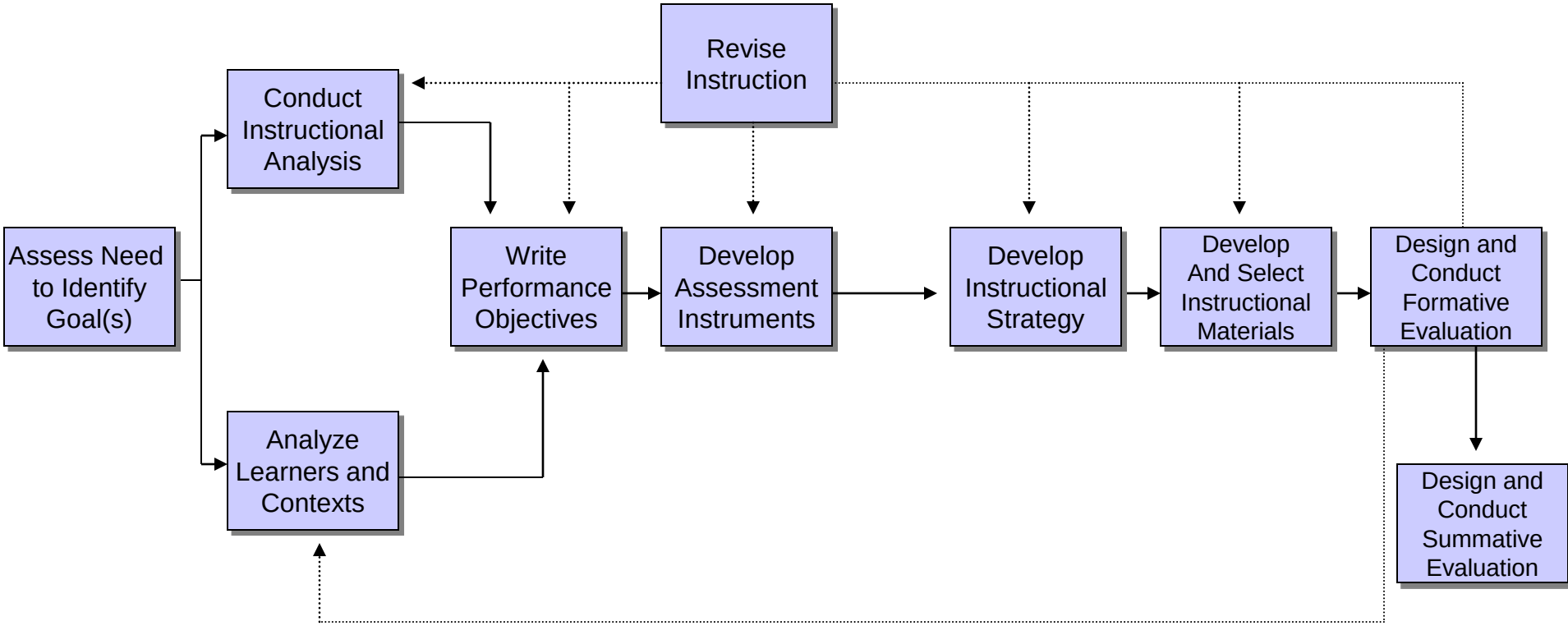
Micro

vs.

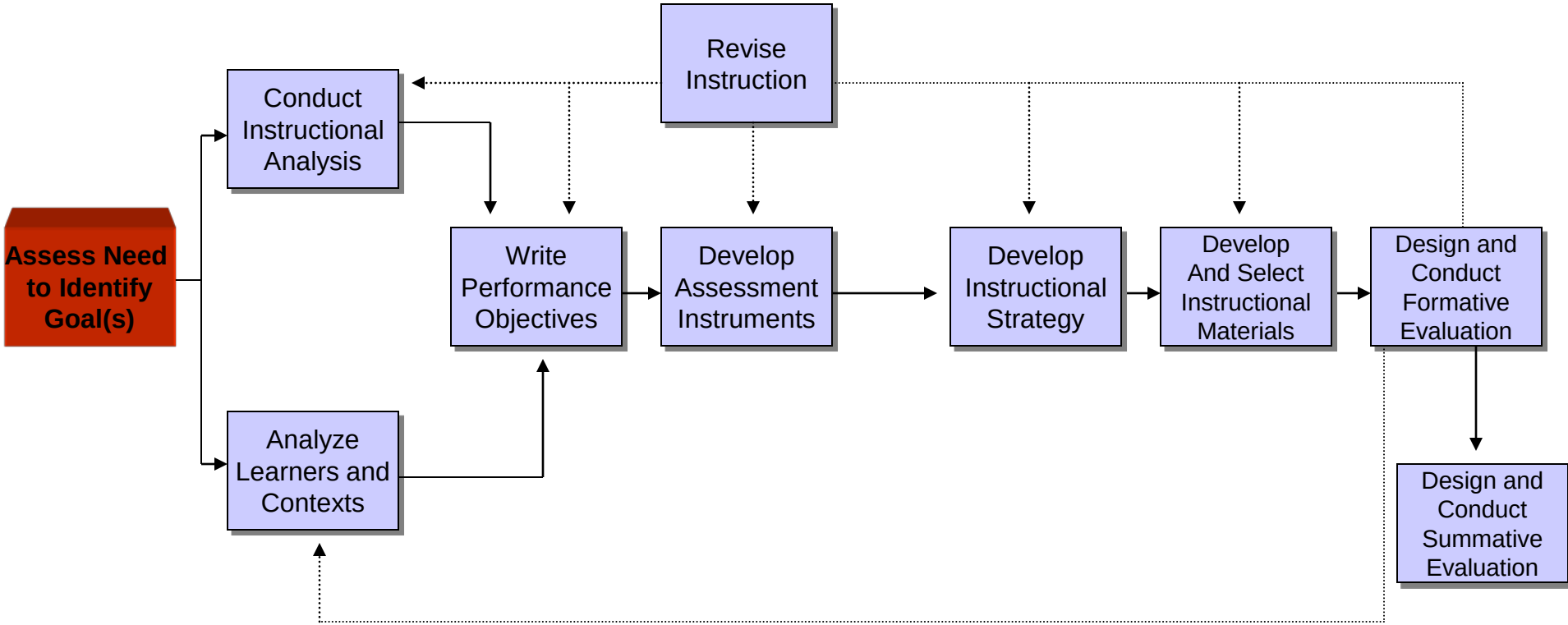


Instructional Design

Components of the System Approach Model



(Dick & Carey's Model)



(Dick & Carey's Model)

Review of the ISD process covered so far…

- An instructional problem is suspected due to symptoms (“clues”) that relate to a gap in learning or performance.
- A formal needs assessment is conducted to verify the problem and to make sure that it is instructional in nature.
- If it is an instructional problem, proceed to the next ISD step, otherwise refer the problem to the appropriate professionals (e.g. physician).

Review of the ISD process covered so far…

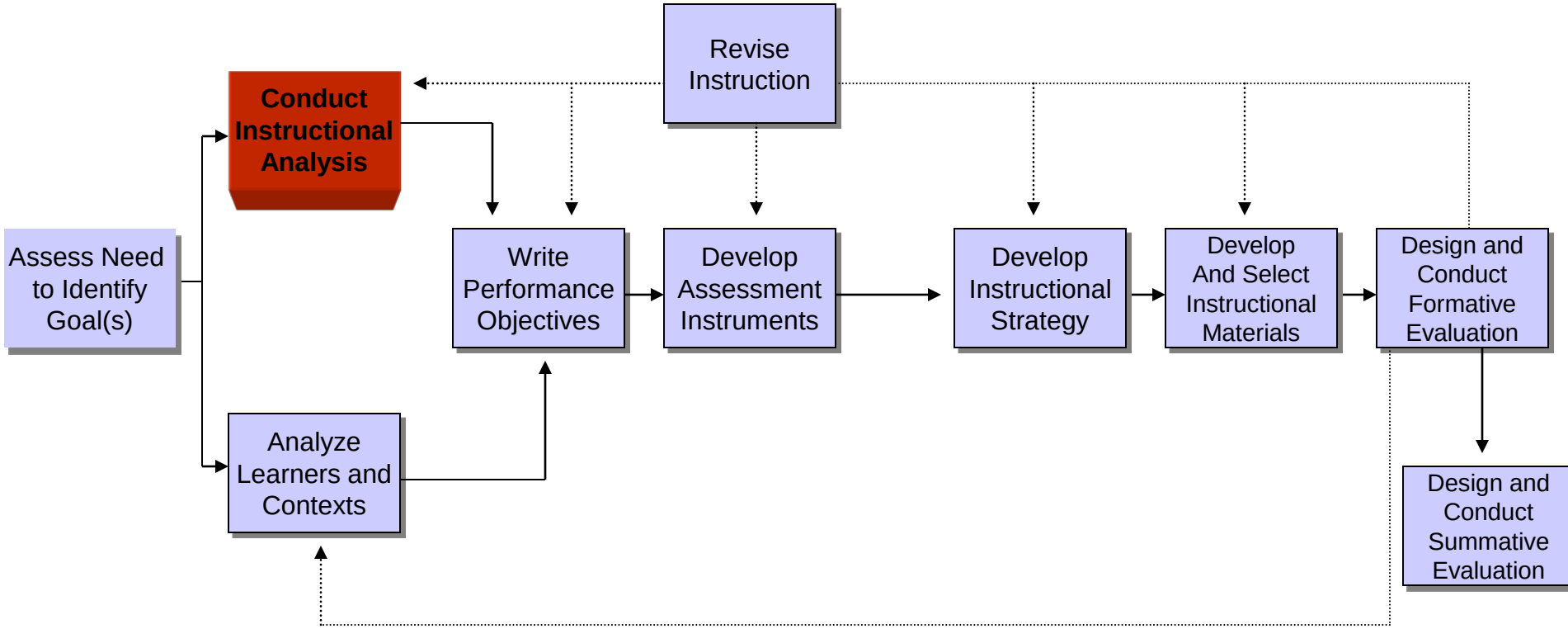
- The output of needs assessment is a list of instructional goals, which is the input for designing a course.
- The output of a course is an instructional curriculum map consisting of a terminal objective and a collection of enabling objectives for each of the course's major sections (called units), which are the inputs for designing each unit.

Review of the ISD process covered so far…

- The output of a unit is a more detailed instructional curriculum map consisting of a terminal objective and a collection of enabling objectives each corresponding roughly to a lesson, along with supporting objectives from other learning domains. These lesson objectives are the input for the micro-design of individual lessons based on Gagne's events of instruction.

Review of the ISD process covered so far…

Process	Input	Output
Needs Assessment	Investigation based on assessment data	Instructional Goals
Course Design	Instructional Goals	Course ICM showing course terminal objective and enabling objectives (units)
Unit Design	Enabling objective from Course ICM	Unit ICM showing unit terminal objective and enabling objectives (lessons), including supporting objectives from other domains (VI, Att.)
Lesson Design	Enabling objective from Unit ICM	Lesson plan consisting of media analysis and instructional strategies for each of the events of instruction.



(Dick & Carey's Model)

Goal Analysis

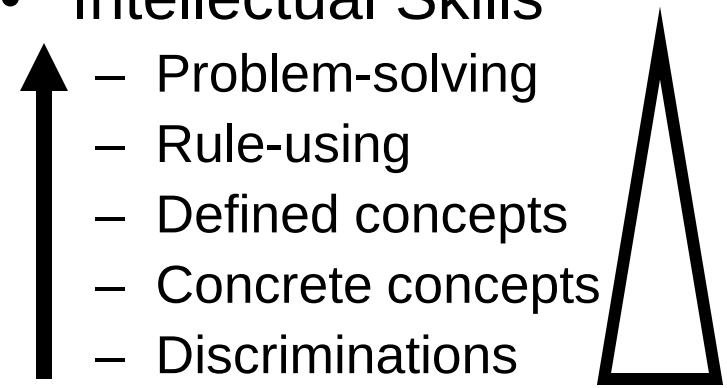
Goal analysis includes two fundamental steps.

- To classify goal statement according to the kind of learning that will occur.
- To identify and sequence the major steps required to perform the goal.

Each of these goals might serve as the starting point for an instructional program. The question is, *" How do we determine what skill must be learned in order to achieve these goals?"* The first step is to categorize the goal into one of Gagne's(1985) domains of learning.

Learning Outcomes: Gagne's Domains of Learning

- Verbal Information
  - Verbatim learning
  - Non-verbatim learning
  - Substance learning
- Intellectual Skills
  - Problem-solving
  - Rule-using
  - Defined concepts
  - Concrete concepts
  - Discriminations
- Cognitive strategies



- Affective
- Psychomotor

Learning Hierarchy

Norm Abrams on the Instructional Design of Shop Safety

"Be sure to read, understand, and follow all the safety guidelines that come with your powertools."

http://www.newyankee.com/

Clearly identifying learning outcomes

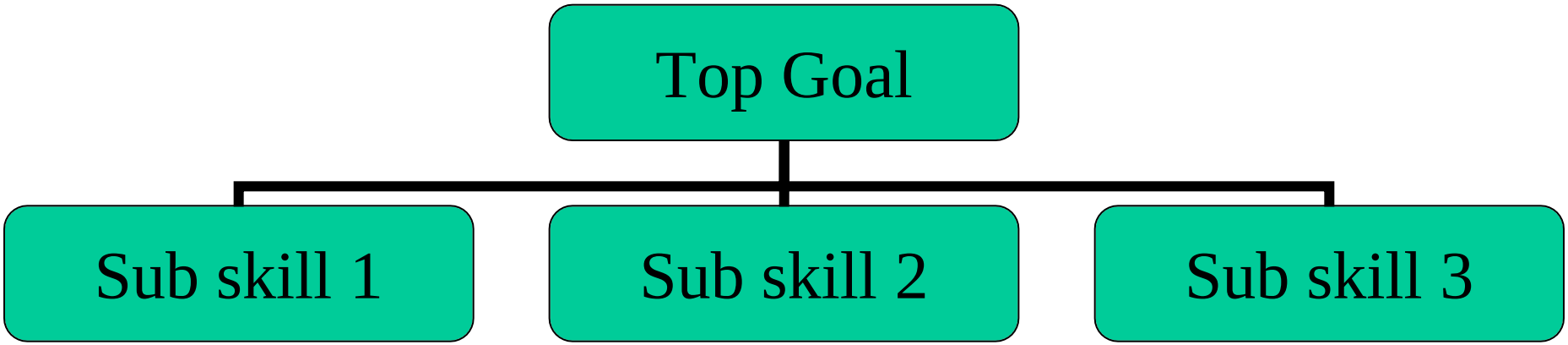
• Problem-solving	**Generate**
• Rule-using	**Demonstrate**
• Concepts	**Classify, identify**
• Verbal information	**State, list, recite, summarize**
• Affective	**Choose**
• Psychomotor	**Execute**

We will cover how to write objectives later, but a good way to start is with: "The student will be able to (SWBAT) generate/demonstrate/classify/identify…

Subordinate skills analysis

– The second step in the instructional analysis.

- Purpose: To identify the appropriate set of subordinate skills for each step

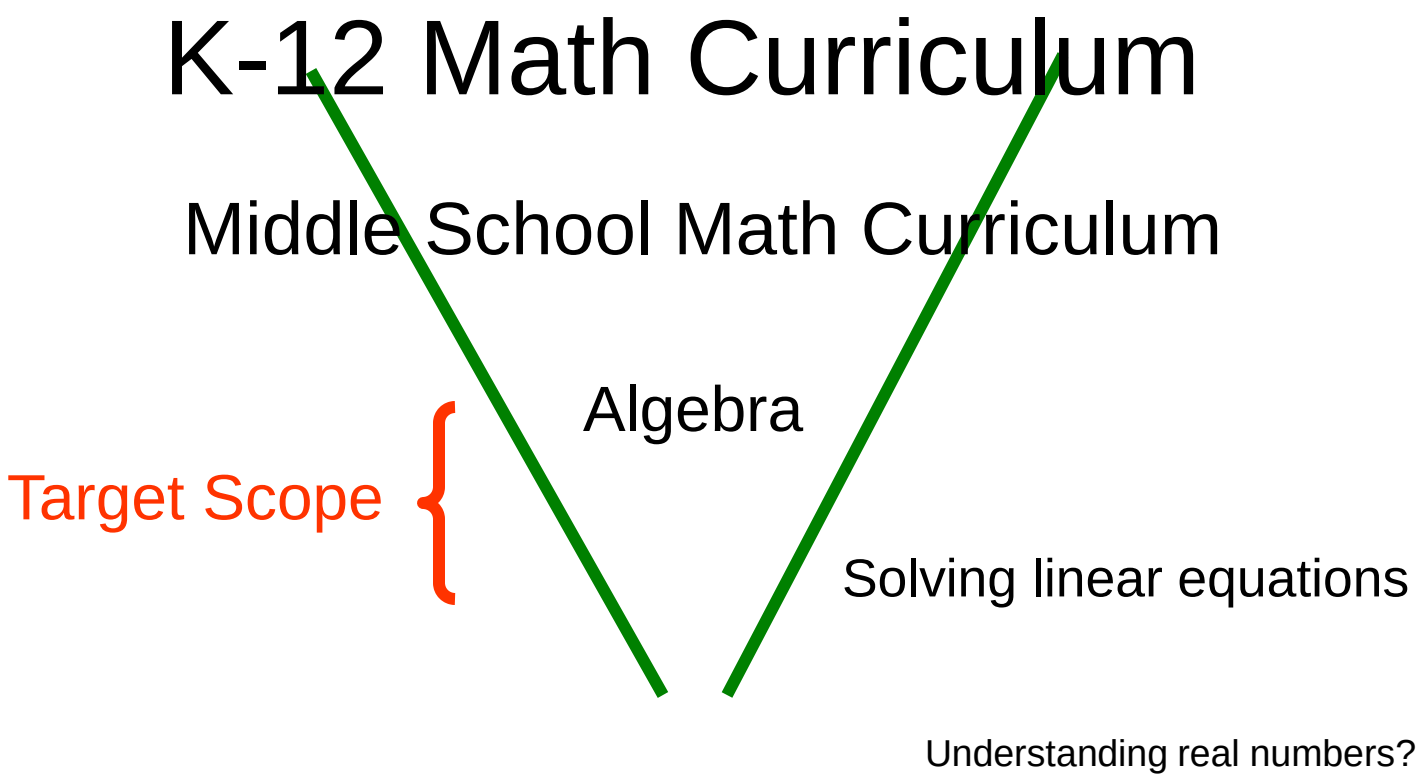


Designing a course is like planning a cross-country road trip

- Start with a USA map… COURSE
- Then use state maps… UNIT
- Finally, use street maps. LESSON
- If you only use street maps from the very start, you will be overwhelmed with detail!

Identifying the Appropriate Scope

- Appropriate scope - think “courses”



At the Course level, your goals/objectives should be…..

Intellectual skills…

- Problem-solving **Generate**
- Rule-using **Demonstrate**

Goals/objectives at concept level are too narrow. These are more suitable for units and lessons.

Example of Goal Analysis at the Course Level

- Topic: Instructional design
- Terminal Objective
  - SWBAT generate an instructional design project by conducting all appropriate procedures for macro- and micro-instructional design.
- Enabling
  - √ Evaluation
  - √ Lesson Design
  - √ Course/Unit design
  - √ Needs Assessment

Example of Goal Analysis at the Course Level

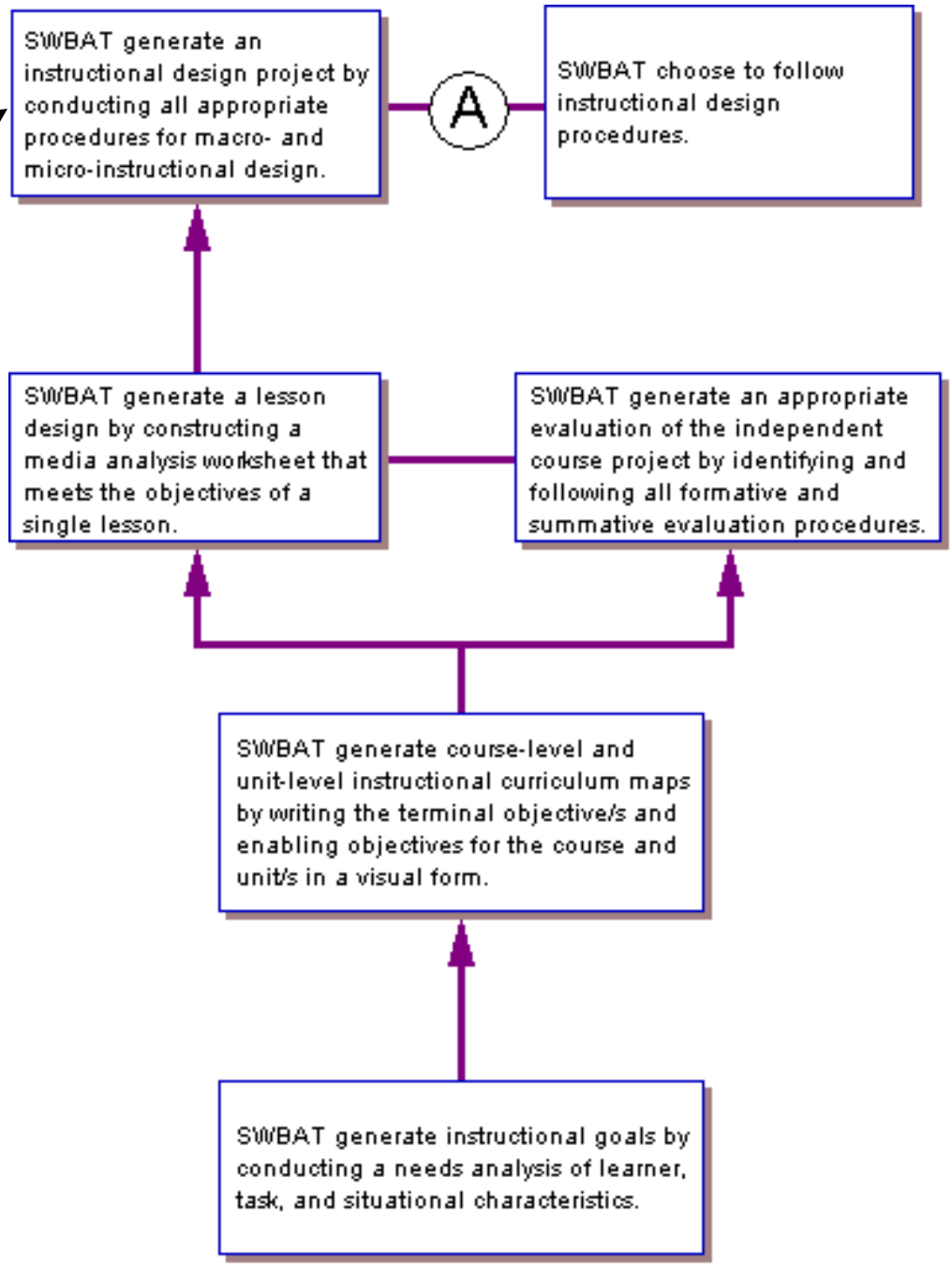
- Enabling Objectives
  - SWBAT generate a lesson design by constructing a media analysis worksheet that meets the objectives of a single lesson.
  - SWBAT generate an appropriate evaluation of the independent course project by identifying and following all formative and summative evaluation procedures.
  - SWBAT generate course-level and unit-level instructional curriculum maps by writing the terminal objective/s and enabling objectives for the course and unit/s in a visual form.
  - SWBAT generate instructional goals by conducting a needs analysis of learner, task, and situational characteristics.

Course's Terminal Objectives:

-SWBAT generate an instructional design project by conducting all appropriate procedures for macro- and micro-instructional design.

-SWBAT choose to follow instructional design procedures.

Enabling Unit Objectives



How Exactly Did I Do This?
Some techniques/aids

- Task analysis: How would an expert do this?
- Hierarchical analysis: Make sure there are no violations (Problem-solving can't come before concepts)
- Experience learning it
- Experience teaching it
- Use problem-solving strategies
  - Write topics/objectives on index cards
  - Use Inspiration AS you brainstorm
- It can be a messy process!

Approaches to subordinate skills analysis

- ❑ Hierarchical Approach
- ❑ Cluster Analysis
- ❑ Subordinate skills analysis techniques for attitude goals
- ❑ Combining Instructional analysis techniques

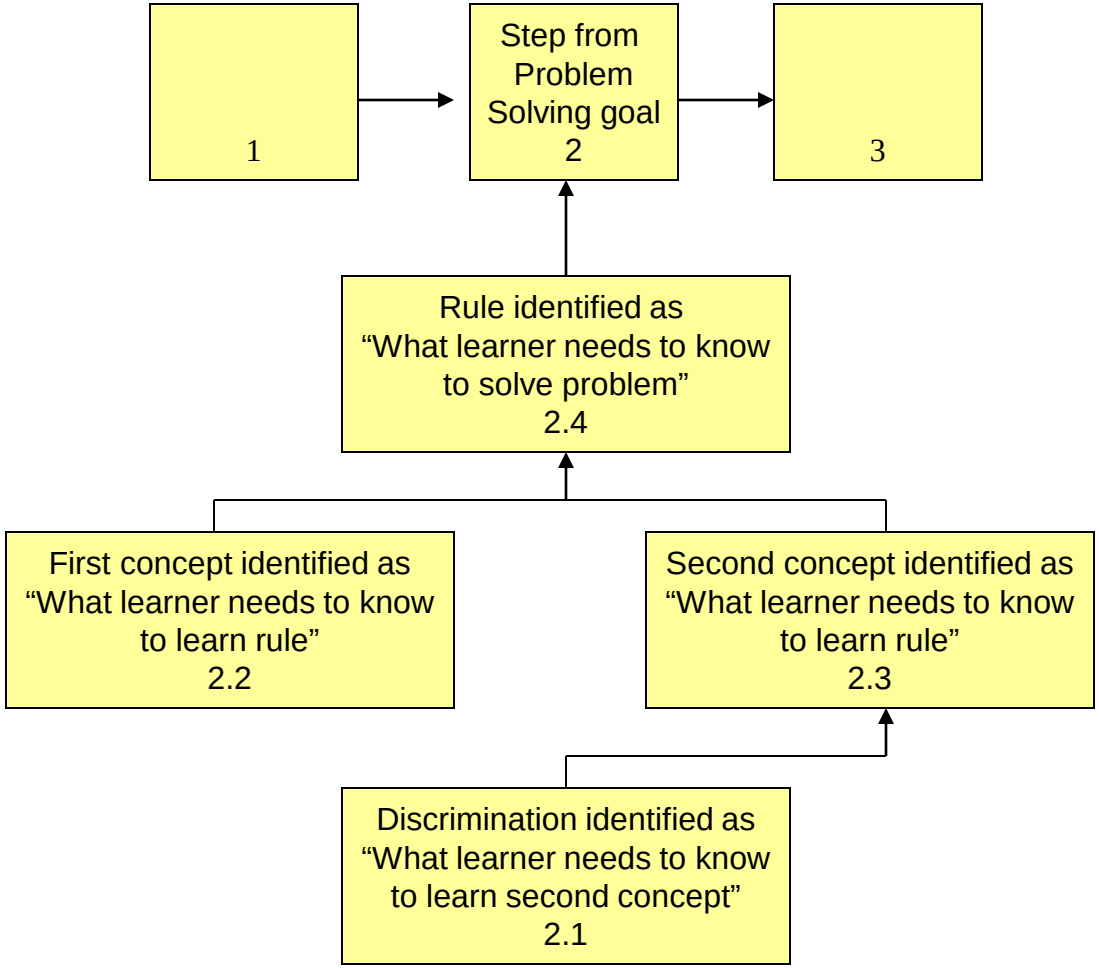
Hierarchical Approach

: Is used to analyze individual steps in the goal analysis that are classified as intellectual or psychomotor skills.

The Hierarchical analysis technique suggested by Gagne.

To apply the hierarchical approach to the steps in the goal analysis…

1. The designer applies it to each step in the goal, including any decision steps.
2. The question is asked, “What would the learner have to know in order to learn to do the first step in the performing the goal?”
3. The question is repeated for each of the subskills for the first step.
4. The question is repeated for each of the remaining steps in the goal.



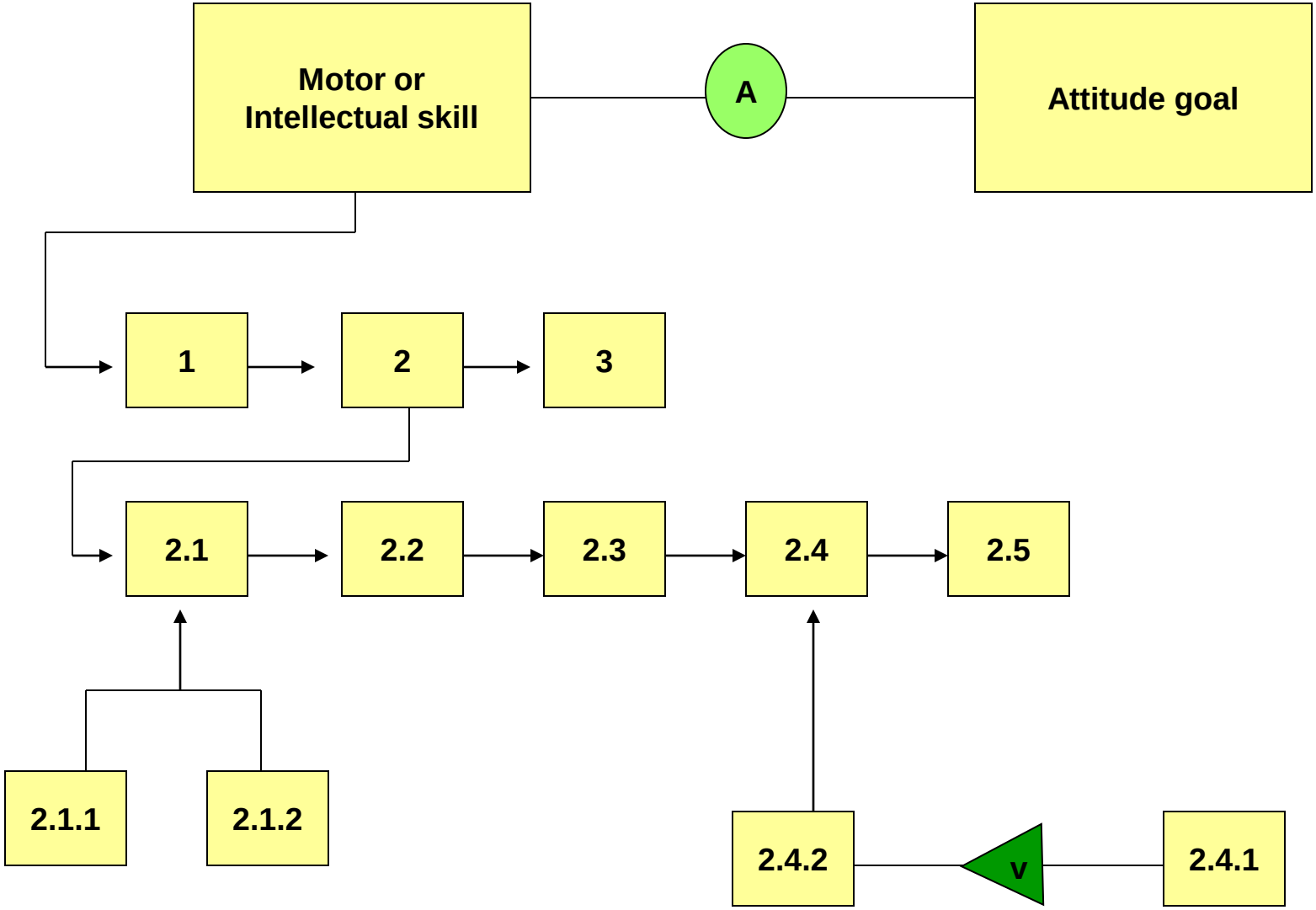
This hierarchy of skill is helpful to the designer because it can be used to suggest the type of specific subordinate skills that will be required to support any particular step in the goal.

Cluster Analysis

How do you identify the subordinate skills for verbal information that should be taught?

The most meaningful analysis of a verbal information goal is to identify the major categories of information.

Example:
The state capitals might be clustered according to geographic.
The bones of the body might be clustered by major parts of the body such as head, arms, legs, and trunk.



< Combining instructional analysis >

Entry Behaviors

: Identify exactly what learners will *already have to know* or be able to do before they begin the instruction.

The procedure used to identify entry behaviors is directly related to the subordinate skills analysis process.

Assume you have such a highly developed hierarchy. It represents the array of skills required to take a learner from the most basic level of understanding up to your instructional goal. It is likely, however, that your learners already have some of these skills, and therefore not be necessary to teach all the skills in the extended hierarchy.

In order to identify the entry behaviors..

1. Examine the hierarchy or cluster analysis
2. Identify those skills that a majority of the learners will have already mastered before beginning your instruction.
3. Draw a dotted line above these skills in the analysis chart

The skills that appear above the dotted line will be those you must teach in your instruction. Those that fall below the line are called entry behaviors.

Why are entry behaviors so important?

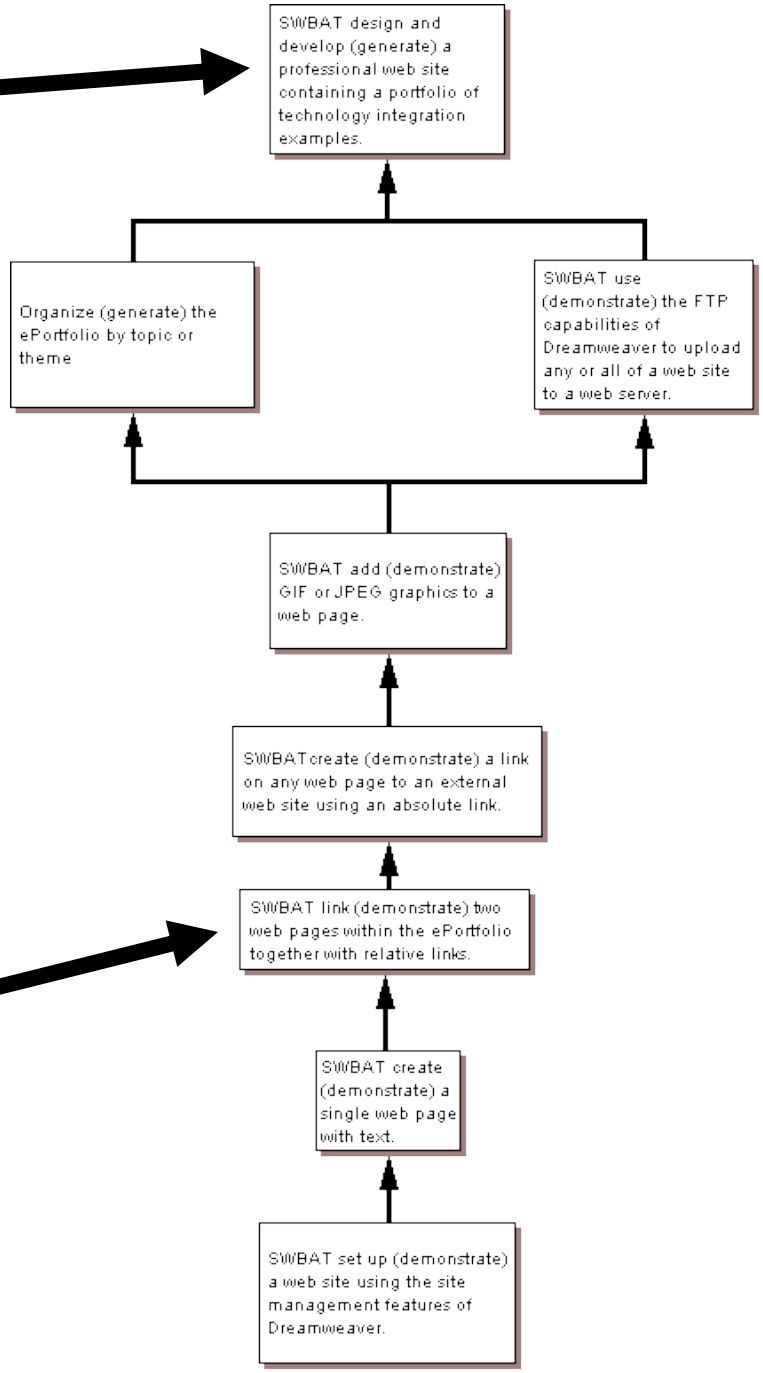
They are defined as the skills that fall directly below the skills you plan to teach; therefore, they are the initial building blocks for your instruction.

Entry behaviors are a key component in the design process.

Course's Terminal Objective:
SWBAT design and develop a professional web site containing a portfolio of technology integration examples.

Choose a unit. The unit objective on the Course ICM is the starting point for the Unit ICM

Unit Objective:
SWBAT link (demonstrate) two web pages within the ePortfolio together with relative links.



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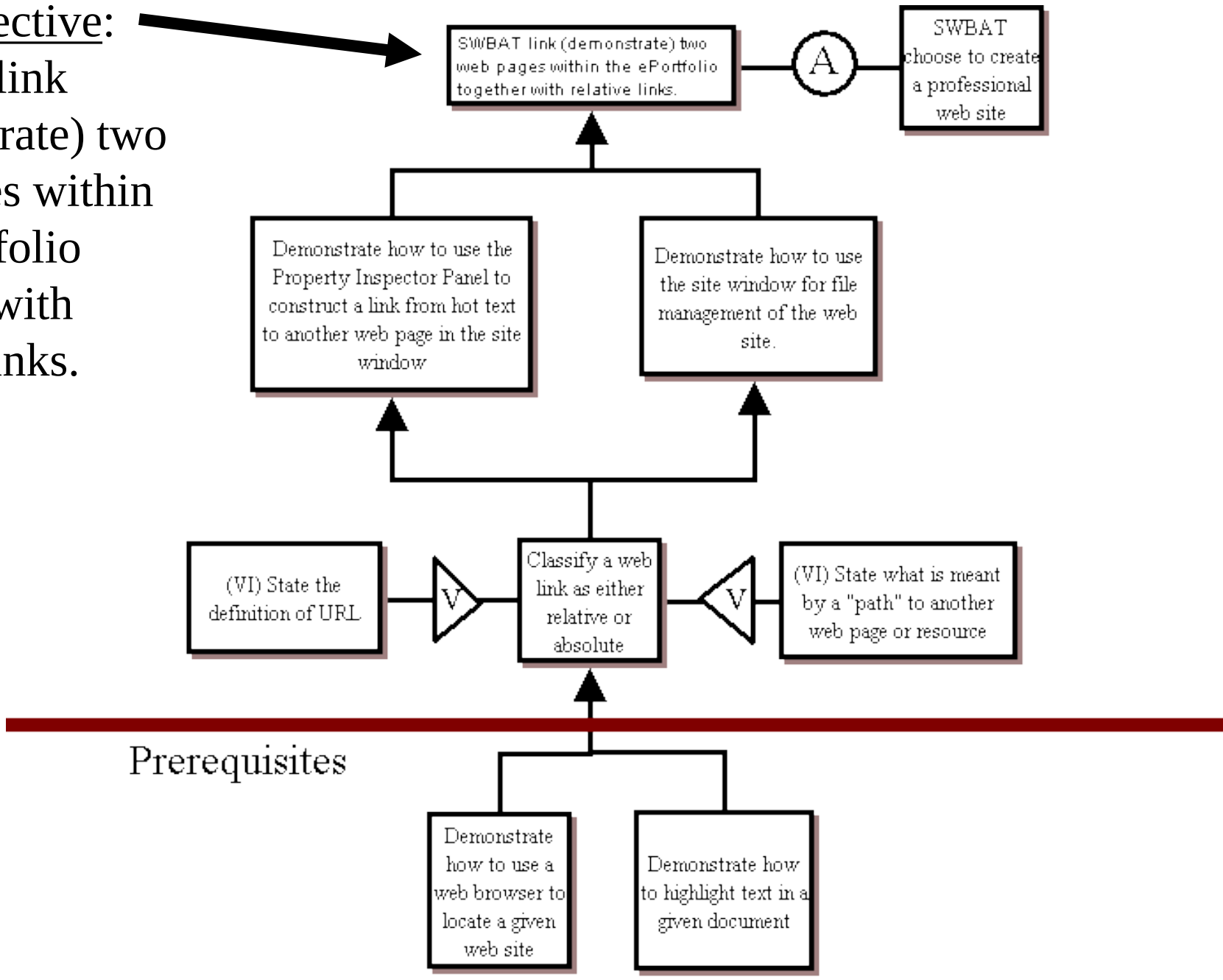

Criticisms of Goal Analysis & Identifying Subordinate Skills

- Based on a reductionist model
- Learning is not just the sum of the parts!
- Learning is much more circular or spiral in nature
- Other models do a better job: Elaboration theory
- Even with these criticisms, the Dick & Carey model is an excellent way to start

Closing

- Instructional Analysis consists of two steps:
  - Goal analysis
  - Subordinate Skills Analysis
- Think “course” for your ID project
  - Course-units-lessons
- Use hierarchical analysis and cluster analysis to help derive the major steps to achieving an instructional goal
- The output of subordinate skills analysis is a Unit-level Instructional Curriculum Map showing the unit terminal objective and enabling objectives (lessons), including supporting objectives from other domains (VI, Att.)
- Be careful in determining entry behaviors!