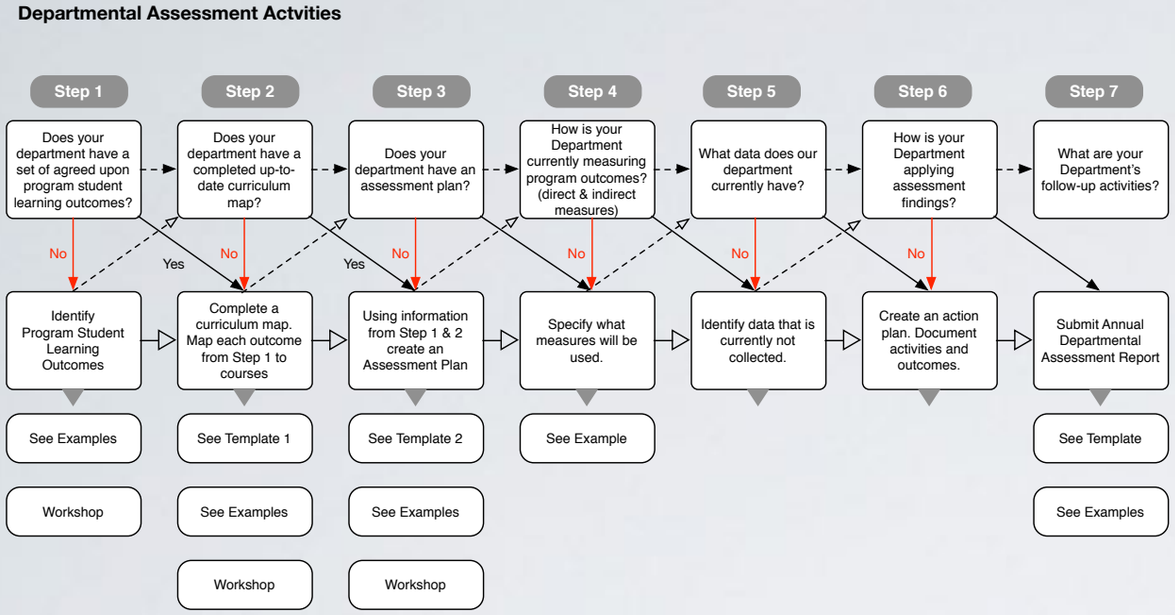
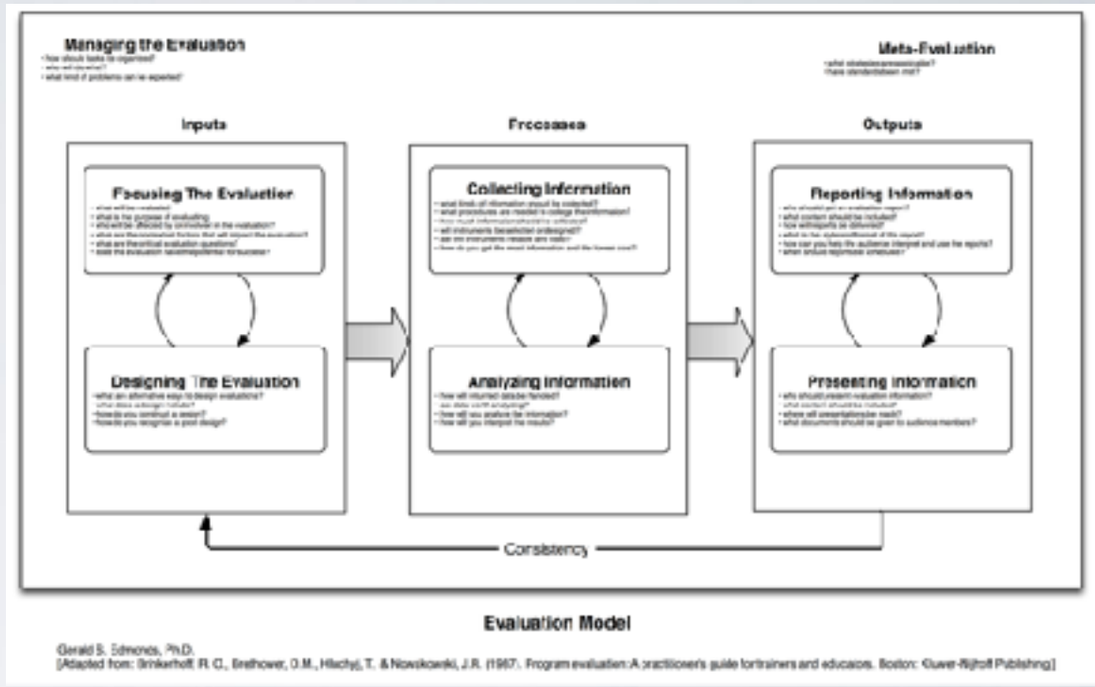
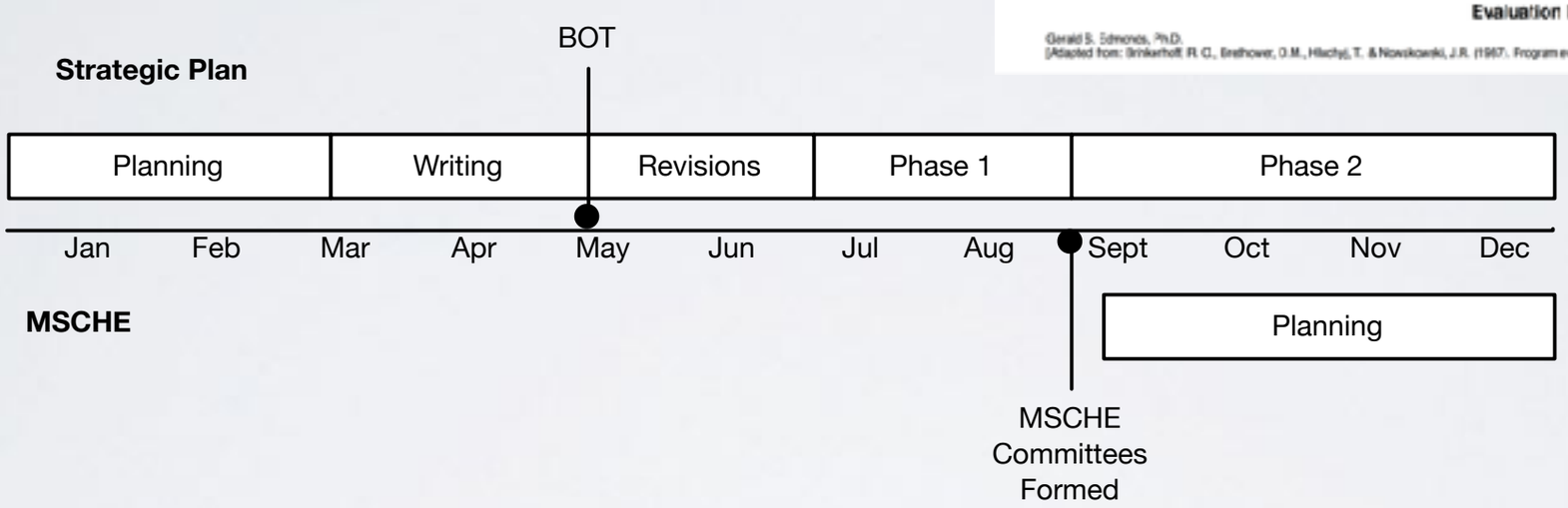




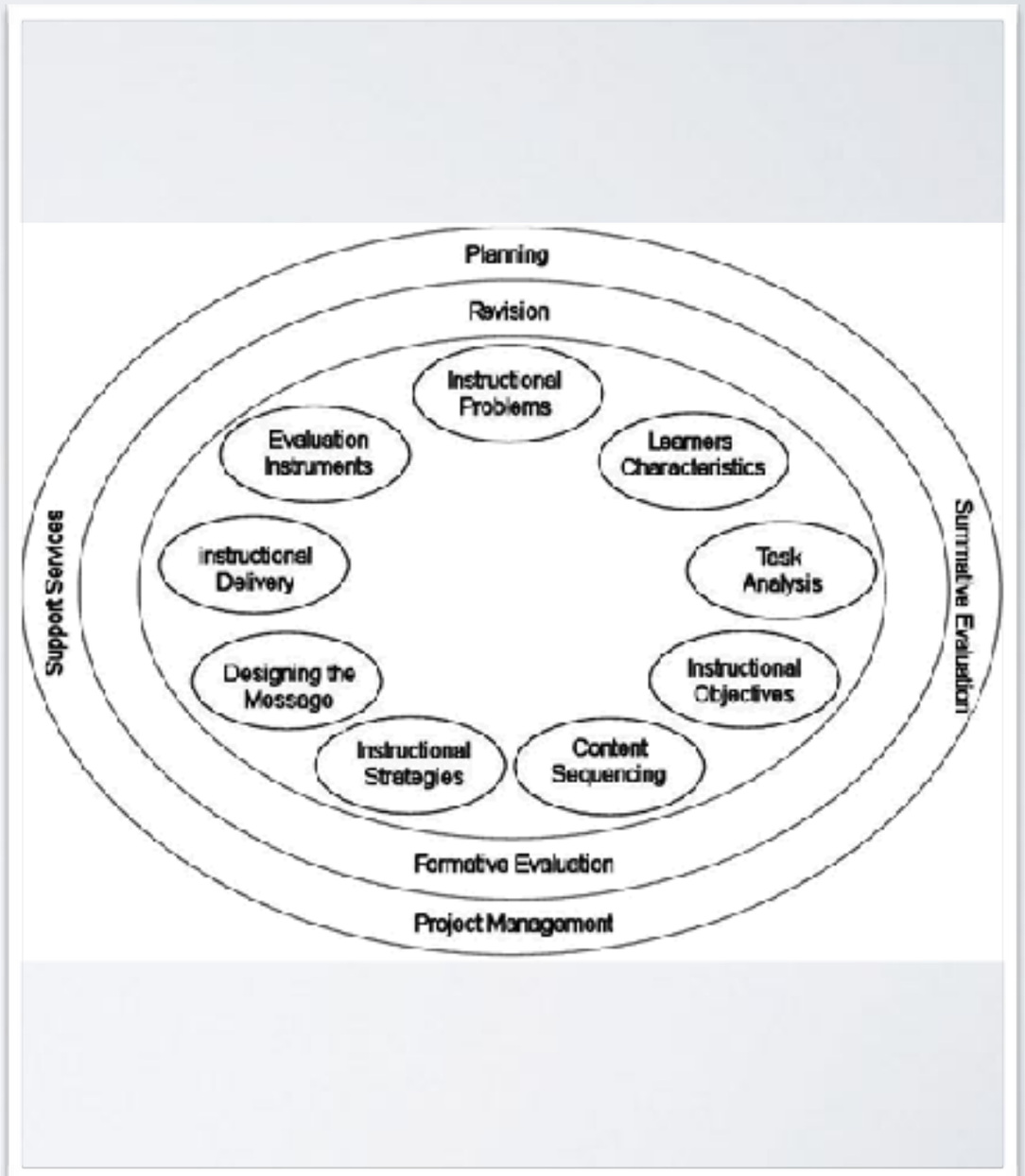


MODELS & MODEL THINKING

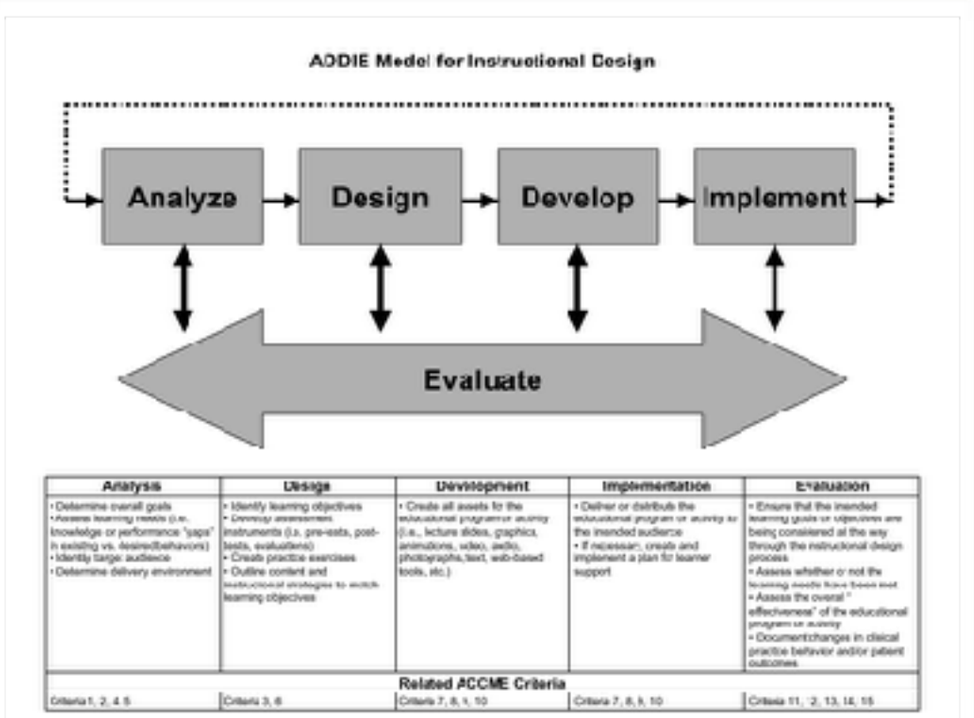
Gerald S. Edmonds, Ph.D.
Assistant Provost | Academic Programs
IDE 632 Spring 2018

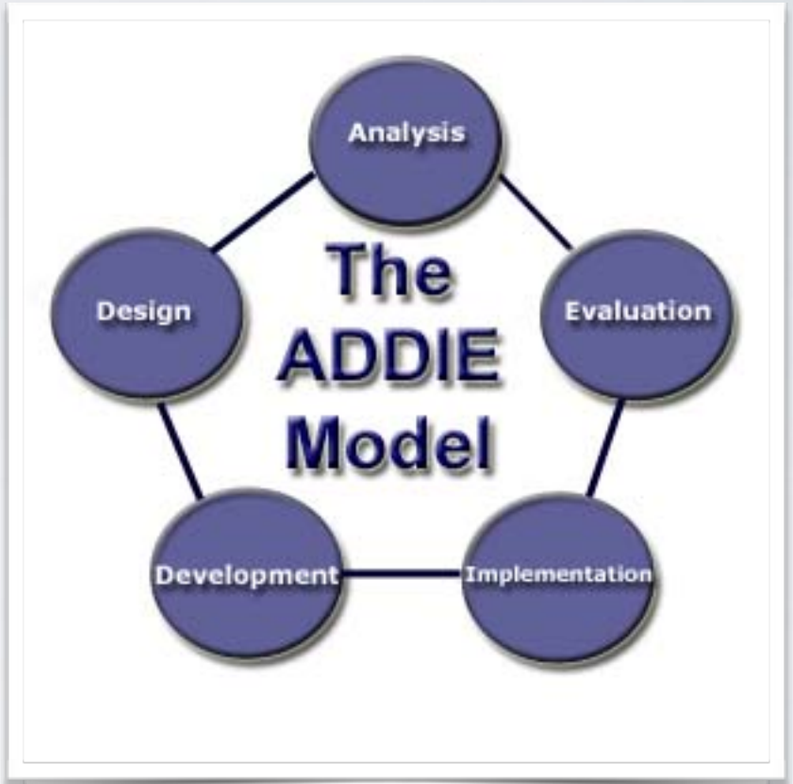
MODELS

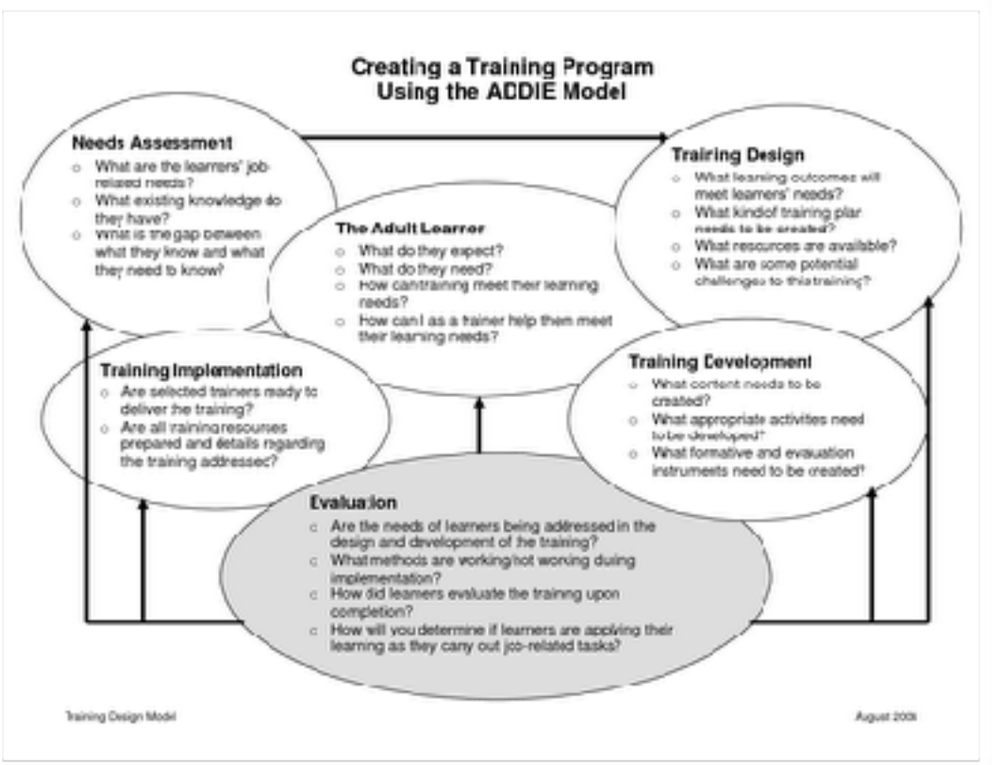
- Models provide frameworks
- Within frameworks deduce the implications of our assumptions and test their veracity
- Need multiple models and ability to speak across them
- Constantly refine and improve our models
- **Physical systems** - simple parts, interacting in large numbers, followed fixed rules (mathematics)
- **Ecological systems** - include social processes, can only explain, model amounts of variations and identify a few factors that have large effects

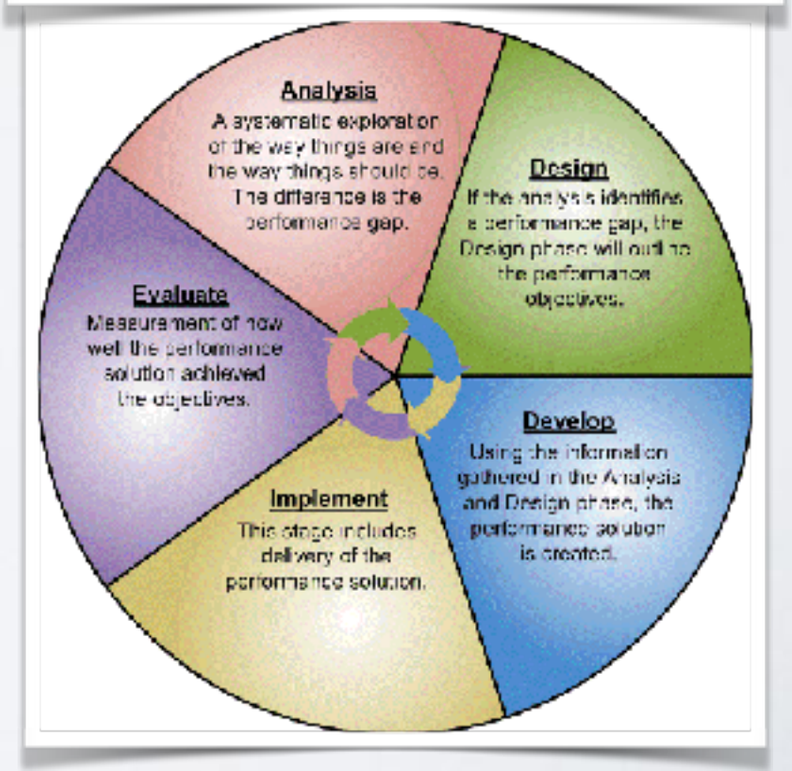


ADDIE


ADDIE Model for Instructional Design
Analyze
Design
Develop
Implement
Evaluate
Analysis
Design
Development
Implementation
Evaluation
Related ACCME Criteria


Analysis
Design
The ADDIE Model
Evaluation
Development
Implementation


Creating a Training Program
Using the ADDIE Model
Needs Assessment
What are the learners' job related needs?
What existing knowledge do they have?
What is the gap between what they know and what they need to know?
The Adult Learner
What do they expect?
What do they need?
How can training meet their learning needs?
How can I as a trainer help them meet their learning needs?
Training Design
What learning outcomes will meet learners' needs?
What kind of training plan needs to be created?
What resources are available?
What are some potential challenges to this training?
Training Implementation
Are selected trainers ready to deliver the training?
Are all training resources prepared and details regarding the training addressed?
Training Development
What content needs to be created?
What appropriate activities need to be developed?
What formative and evaluation instruments need to be created?
Evaluation
Are the needs of learners being addressed in the design and development of the training?
What methods are working/not working during implementation?
How did learners evaluate the training upon completion?
How will you determine if learners are applying their learning as they carry out job-related tasks?
Training Design Model
August 2008


Analysis
A systematic exploration of the way things are and the way things should be. The difference is the performance gap.
Design
If the analysis identifies a performance gap, the Design phase will outline the performance objectives.
Develop
Using the information gathered in the Analysis and Design phase, the performance solution is created.
Implement
This stage includes delivery of the performance solution.
Evaluate
Measurement of how well the performance solution achieved the objectives.

WHY MODEL?

- We model all the time in framing our reality and in attempting to understand, explain and predict

- Explicit models - assumptions are laid out in details

- Examine assumptions - this is what happens

- Alter assumptions - that is what happens

- Sensitivity analysis - look at range of parameters over possible scenarios to identify uncertainties, robustness and thresholds

MODEL GOALS

1. Explain (very distinct from predict)
2. Guide data collection
3. Illuminate core dynamics
4. Suggest dynamical analogies
5. Discover new questions
6. Promote a scientific habit of mind
7. Bound (bracket) outcomes to plausible ranges
8. Illuminate core uncertainties
9. Offer crisis options in near-real time
10. Demonstrate tradeoffs / suggest efficiencies
11. Challenge the robustness of prevailing theory through perturbations
12. Expose prevailing wisdom as incompatible with available data
13. Train practitioners
14. Discipline the policy dialogue
15. Educate the general public
16. Reveal the apparently simple (complex) to be complex (simple)

REASONS FOR MODELS

- Intelligent Practitioner
- Clearer Thinker
- Understand and Use Data
  - from information to knowledge
- Decide, Strategize and Design

WORKING WITH MODELS

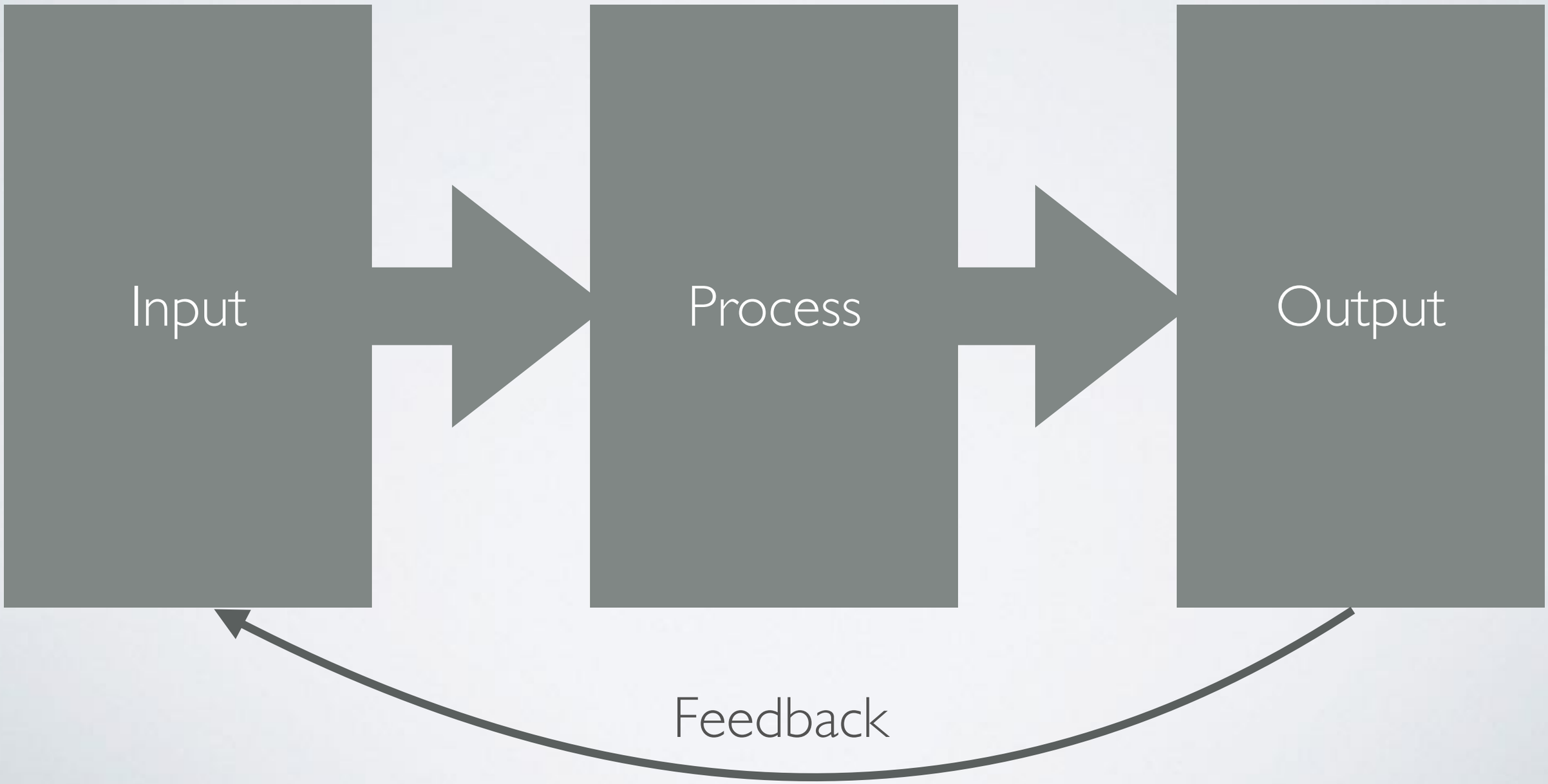
- **Name the Parts**
  - don't worry about fitting everything together
  - brainstorm (Post it notes)
- **Identify the Relationships between the parts**
  - how does one part lead to the next?
  - how are parts linked?

WORKING CON'T

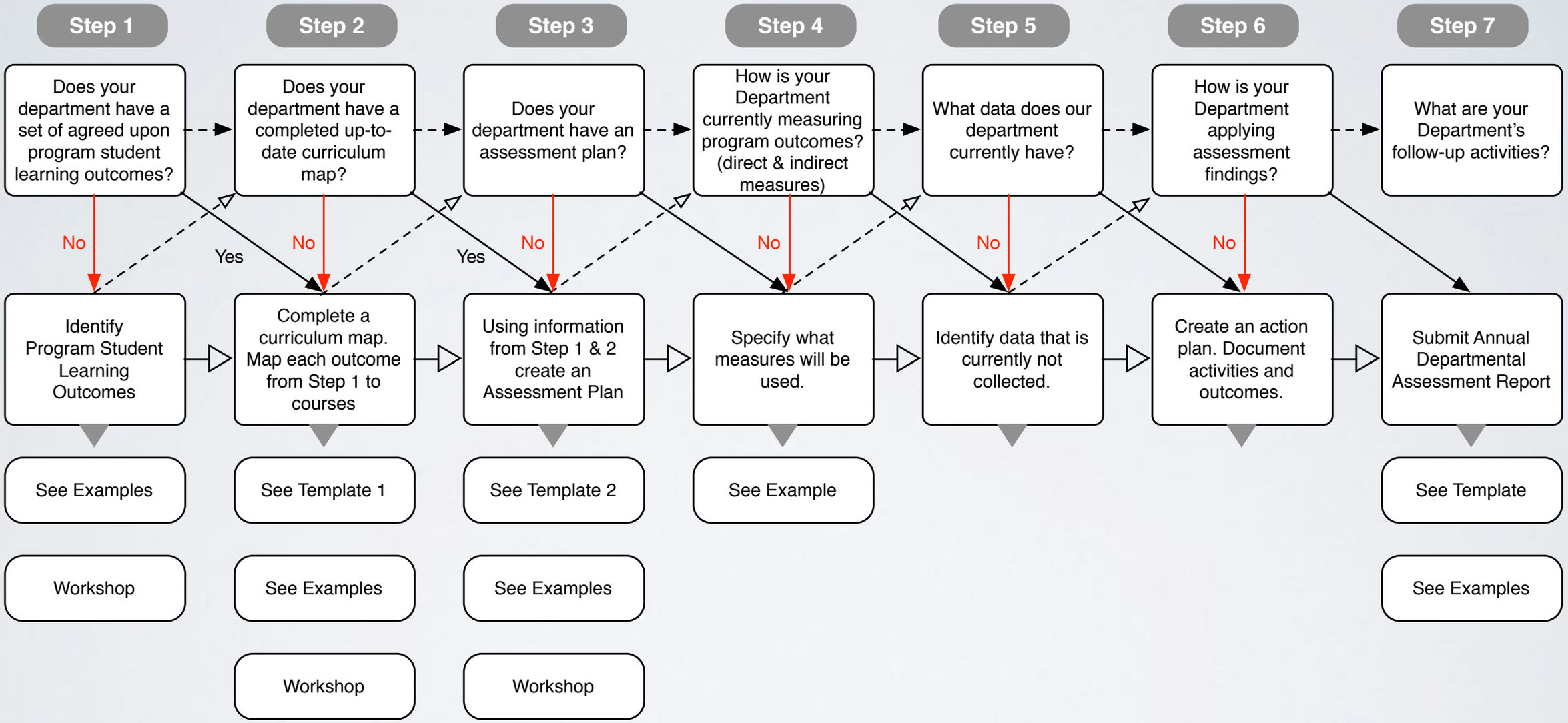
- **Inductively explore**
- **Understand Class of Outcome**
  - equilibrium, cycle, random, complex
- **Identify Logical Boundaries**
- **Communication**

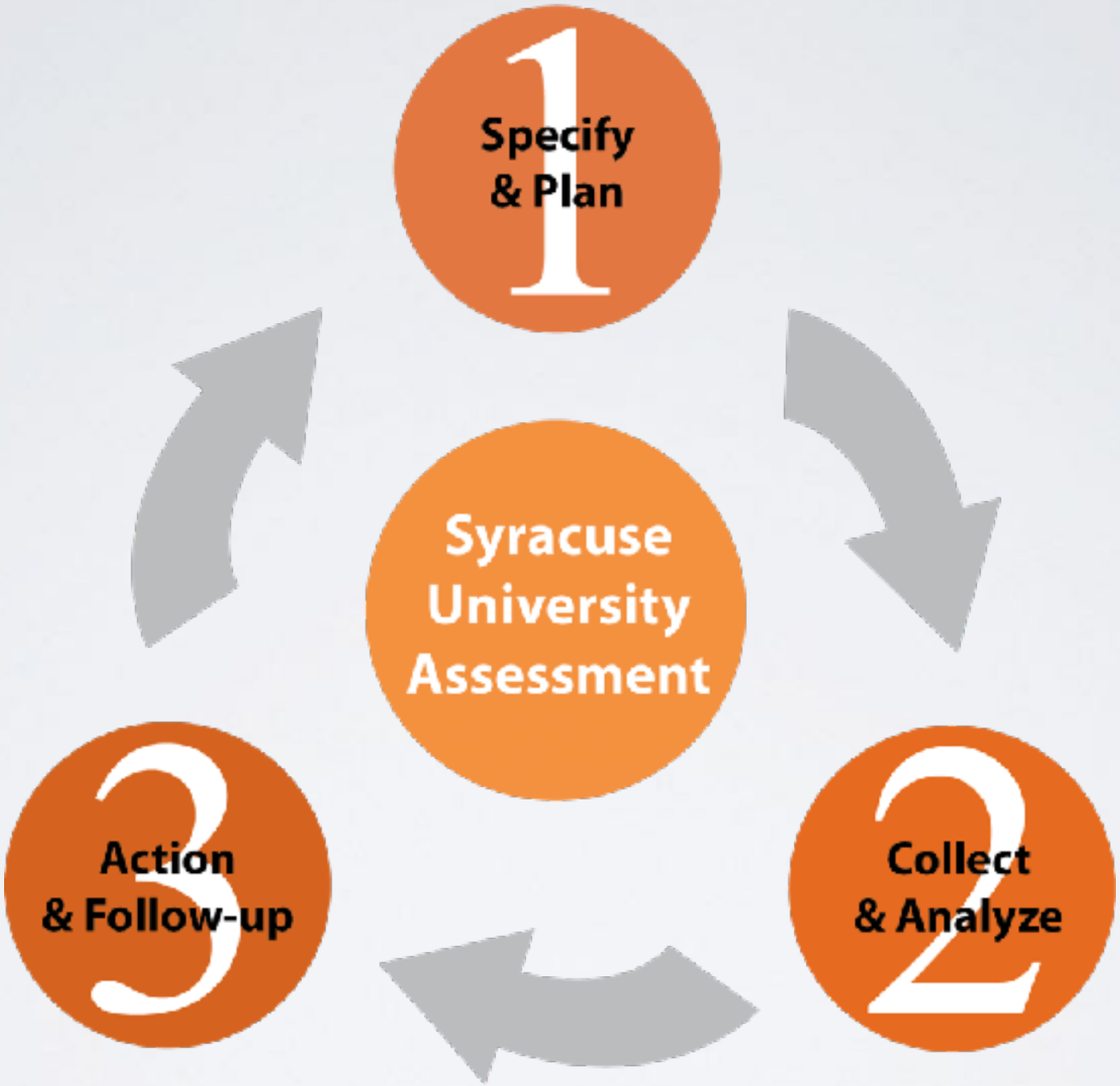
MODEL EXAMPLES

SIMPLE SYSTEM

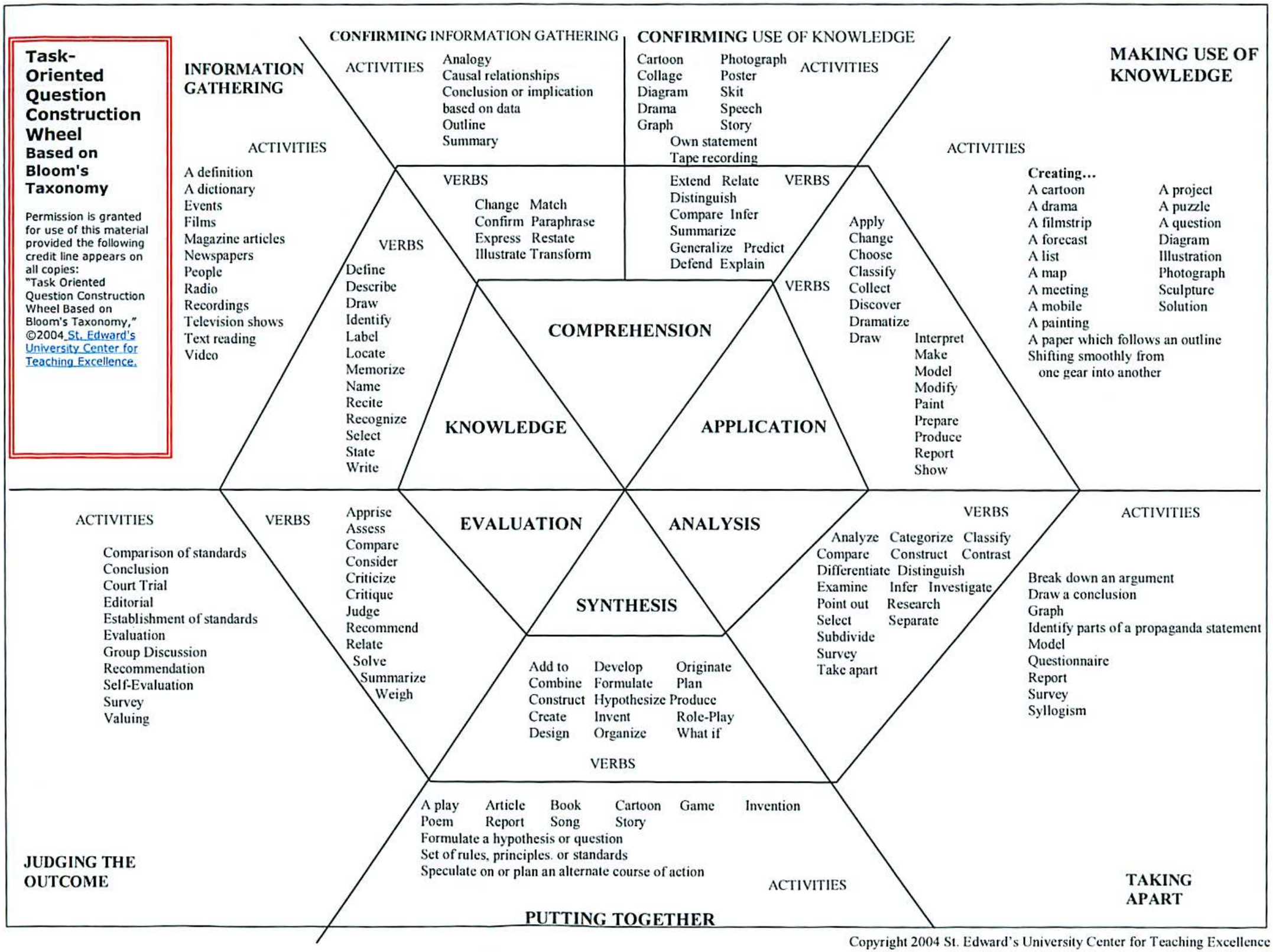


Departmental Assessment Actvities

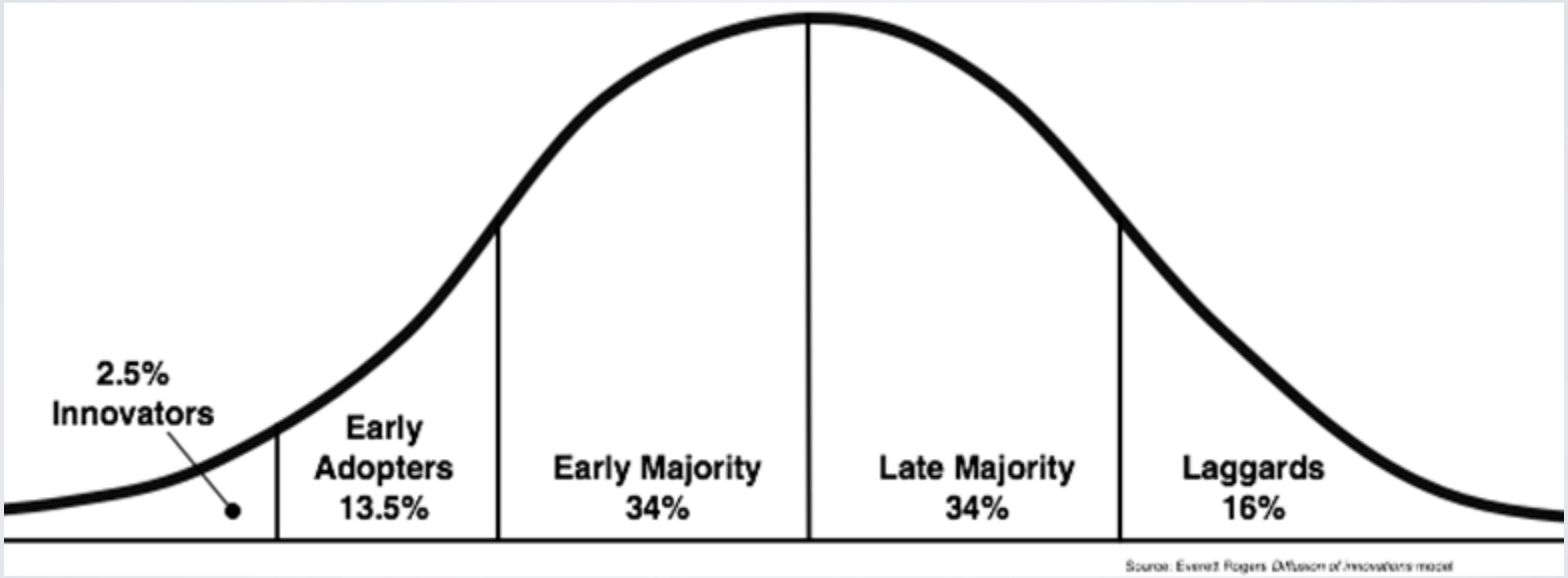



1
Specify
& Plan
Syracuse
University
Assessment
2
Collect
& Analyze
3
Action
& Follow-up

Task-Oriented Question Construction Wheel
Based on Bloom's Taxonomy

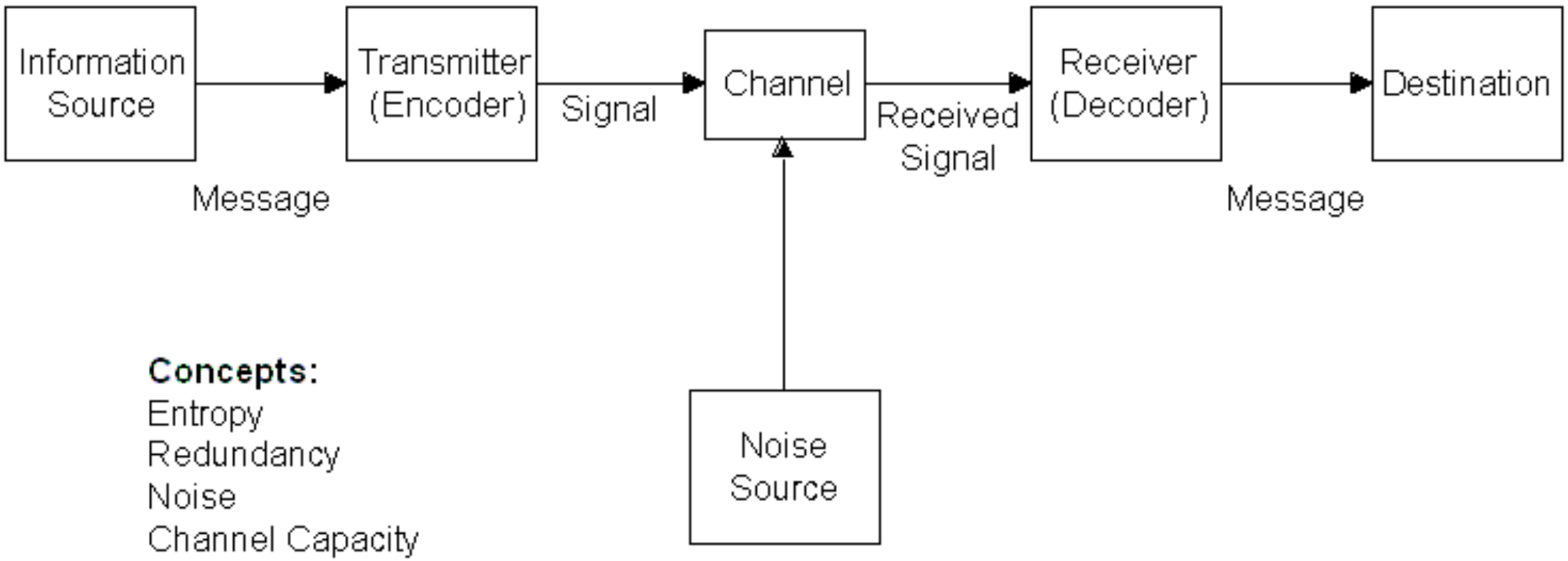


DIFFUSION OF INNOVATION



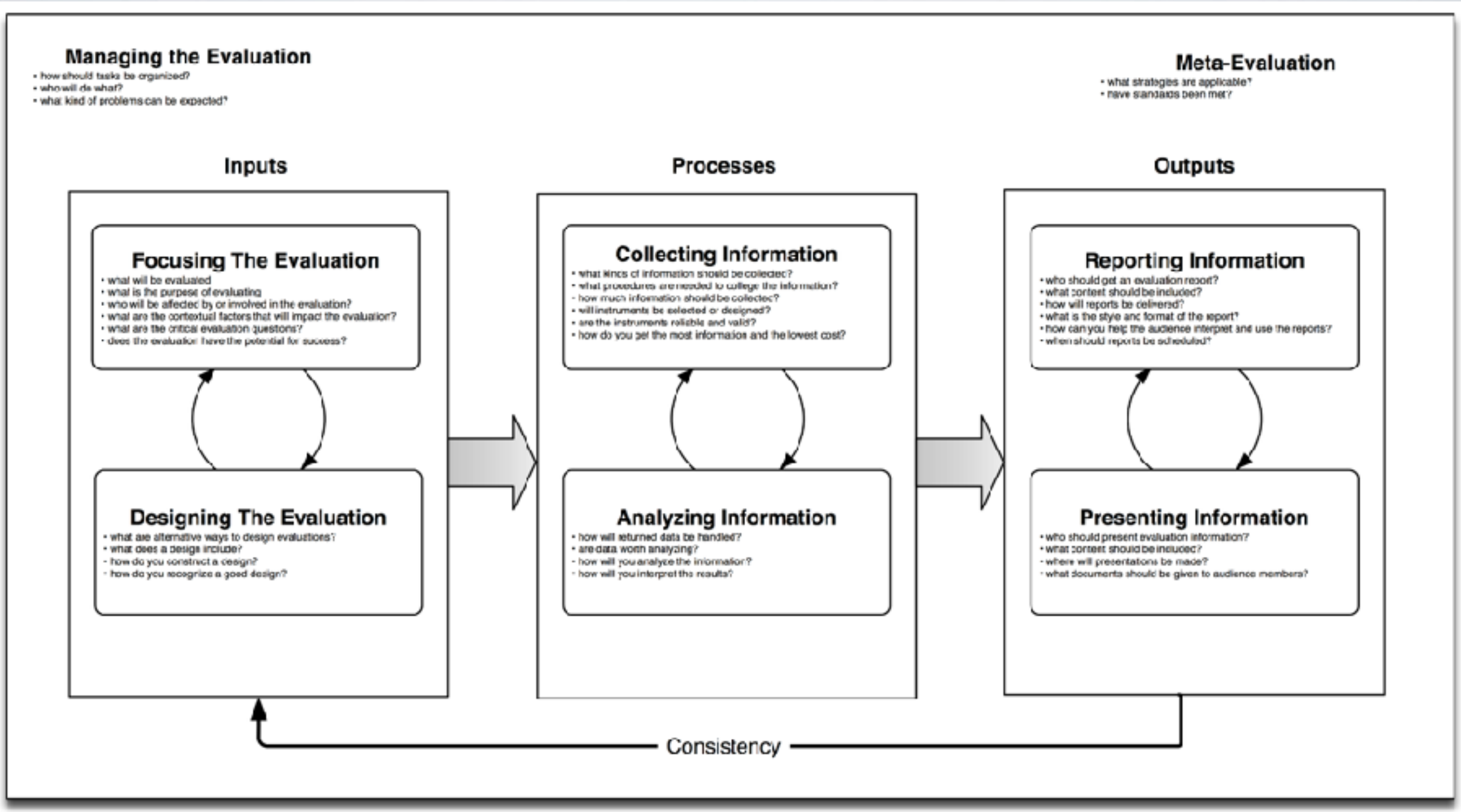
COMMUNICATION MODEL

The Shannon-Weaver Mathematical Model, 1949



Concepts:
Entropy
Redundancy
Noise
Channel Capacity

EVALUATION



Evaluation Model

Gerald S. Edmonds, Ph.D.
[Adapted from: Brinkerhoff, R. O., Brethower, D.M., Hluchyj, T., & Nowakowski, J.R. (1987). Program evaluation: A practitioner's guide for trainers and educators. Boston: Kluwer-Nijhoff Publishing.]

S/C Strategic Plan

S/C Strategic Plan

S/C Strategic Plan

S/C Strategic Plan

S/C Strategic Plan

S/C Strategic Plan

S/C Strategic Plan

S/C Strategic Plan

S/C Strategic Plan

S/C Strategic Plan

Map

School/College Goals X School/College Goals

	A&S	Arch	ECS	Falk	Grad S	iSchool	Law	Maxwell	Newhouse	SOE	UC	VPA	Whitman
A&S													
Arch													
ECS													
Falk													
Grad S													
iSchool													
Law													
Maxwell													
Newhouse													
SOE													
UC													
VPA													
Whitman													

Map

School/College Goals X ASP Themes/Goals

	ASP 1	ASP 2	ASP 3	ASP 4	ASP 5	ASP 6	ASP 7
A&S							
Arch							
ECS							
Falk							
Grad S							
iSchool							
Law							
Maxwell							
Newhouse							
SOE							
UC							
VPA							
Whitman							

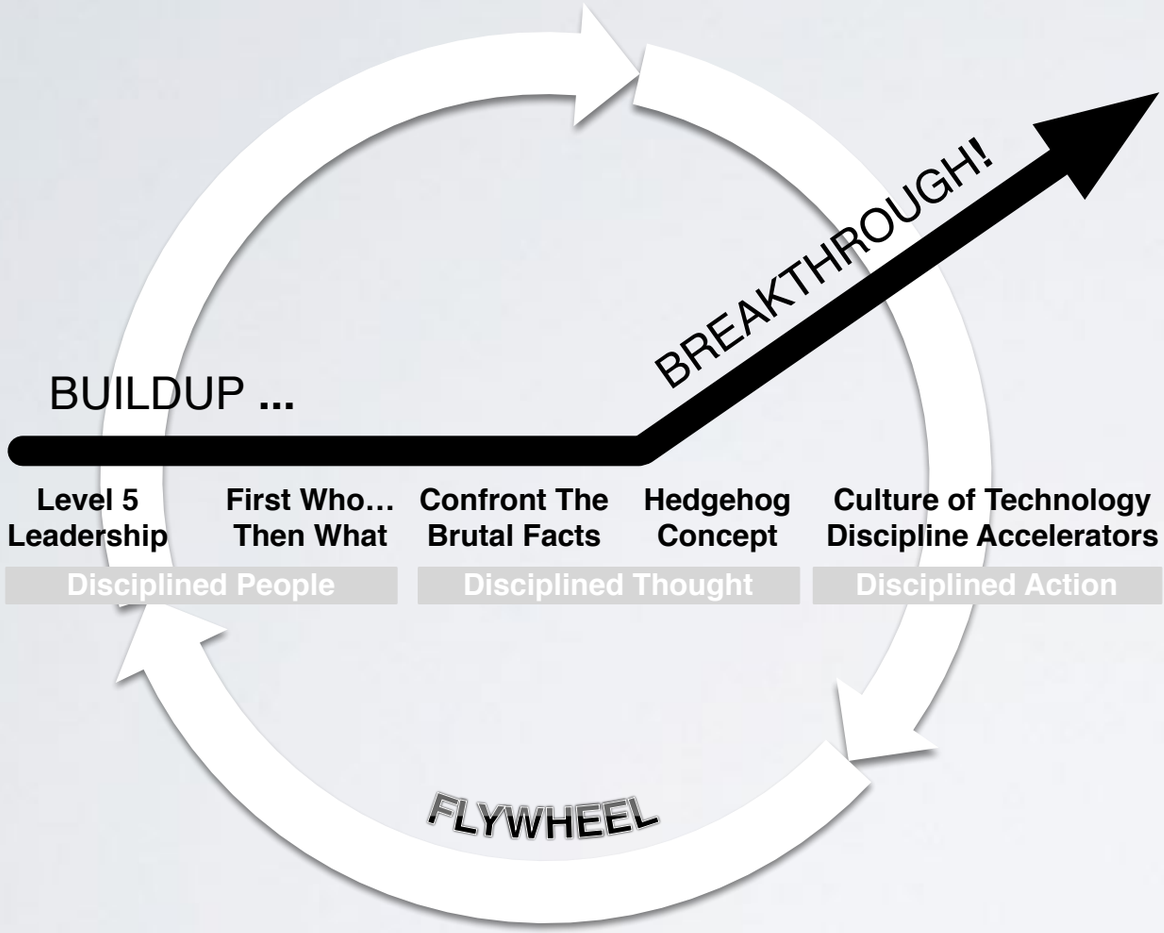
SYRACUSE UNIVERSITY

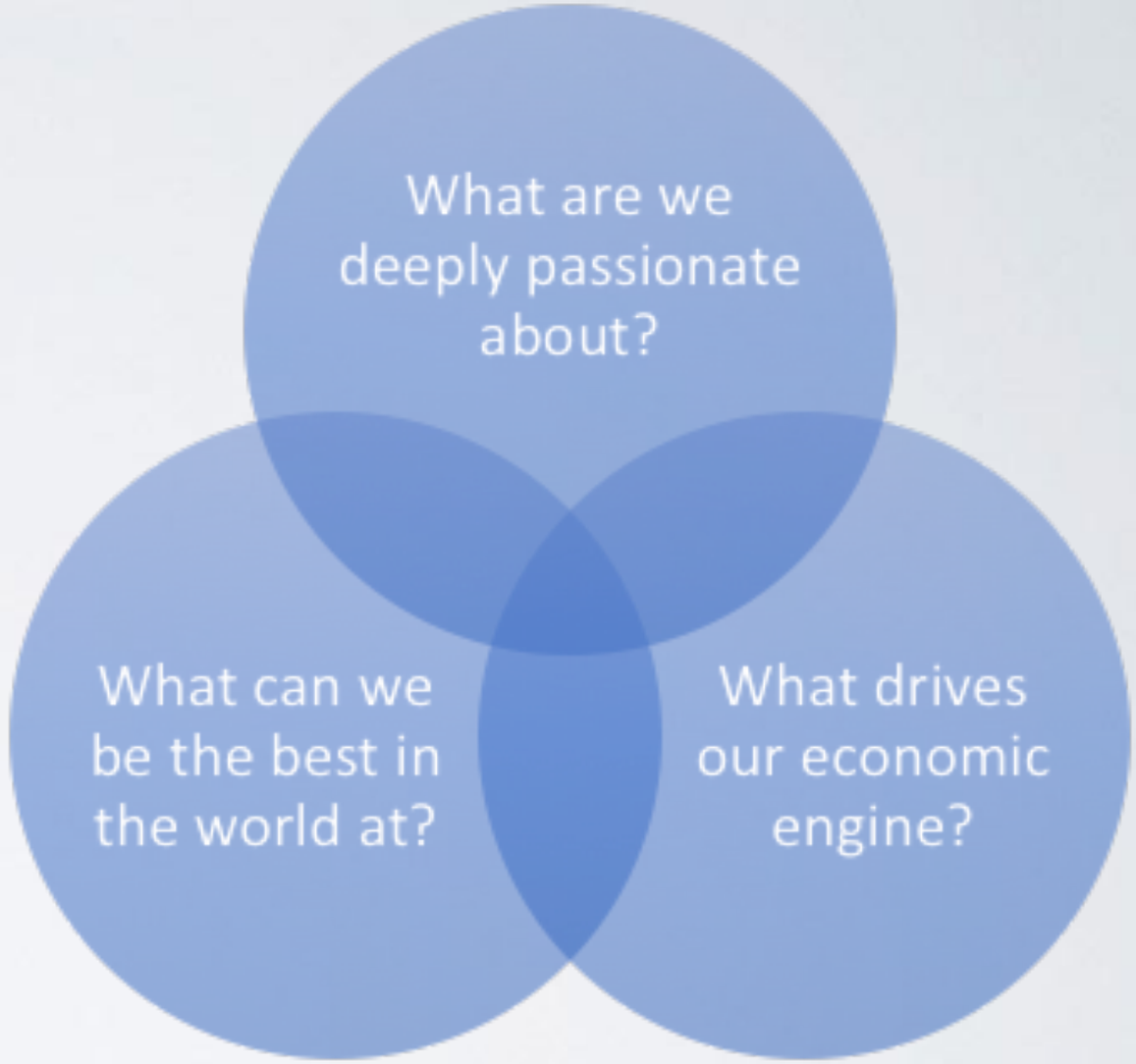
School or College Strategic Planning Rubric

This rubric is intended to assess the status of school or college strategic planning at Syracuse University. Each component of the University's school or college strategic planning charge is incorporated in the rubric. A sustainability component is included as well, providing the expectation that each school or college will sustain a well-designed and manageable planning process to inform decision-making.

Element	SU Expectation	Not Evident – 0	Emerging – 1	Developing – 2	Proficient – 3	Score	Comments
SWOT Analysis	The school or college has a comprehensive and realistic analysis of strengths, weaknesses, opportunities and threats (SWOT). The SWOT analysis includes both qualitative and quantitative data related to the school or college internal and external environment. Analysis consider higher education trends at the local, state or national level. The SWOT recognizes that Syracuse University, and by extension the schools and colleges, operates in a competitive environment.	No SWOT analysis included.	SWOT analysis is missing several key elements. • No qualitative data included • No quantitative data included • Internal environment not analyzed • External environment not analyzed • Analysis does not consider higher education trends at the local, state or national level	SWOT analysis is missing some key elements. • Some qualitative data included • Some quantitative data included • Internal environment somewhat analyzed • External environment somewhat analyzed • Analysis considers higher education trends at the local, state or national level at a superficial level	The school or college SWOT is comprehensive and is a realistic analysis of strengths, weaknesses, opportunities and threats (SWOT). The SWOT analysis includes both qualitative and quantitative data related to the school or college internal and external environment. Analysis considers higher education trends at the local, state or national level.		
Vision Statement	The school or college has a forward oriented vision statement that captures the school or college's aspirations of what it wants to become. The school or college vision statement is communicated to all faculty, staff and students.	No school or college vision statement included in the plan.	The vision statement is vague and does not project the future aspirational school or college state. The vision statement does not capture what the school or college wants to be. The vision statement creates little interest in the school or college. The vision statement does not differentiate the school or college from competing institutions.	A vision statement has been developed, but does not specifically capture what the school or college wants to be. The vision statement creates some interest in the school or college.	The vision statement is well developed and provides an inspirational foundation for the school or college. The vision statement is aspirational and captures what the school or college wants to be. The vision statement differentiates the school or college from competing institutions.		
Mission Statement	The school or college has an appropriate mission statement that reflects the purpose and values of the school or college. A clear mission states answers the following questions: • Who are we? • What is our philosophy, values and culture? • What makes us unique? Purpose sets the stage for goals and subsequent objectives. The school or college mission statement aligns with the University's mission and values outlined in the Trajectory to Excellence. The school or college mission statement is communicated to all faculty, staff and students.	No school or college mission statement included in the plan.	Mission statement is vague. Mission statement is too long and not easily remembered by students, faculty and/or staff. The mission statement does not align with the Trajectory to Excellence.	A mission statement has been developed. The mission statement clearly documents the school/college purpose. Purpose sets the stage for goals and subsequent objectives. Mission statement somewhat answers the key questions. The mission statement has some alignment with Trajectory to Excellence	The mission statement is well developed and clear. Communicates the school or college purpose. Purpose and guiding principles are well developed. Mission statement clearly answers the key questions. The school or college mission statement aligns with the University's mission outlined in the Trajectory to Excellence. Faculty/staff/students are aware of the mission statement.		
Goals	Through strategic analysis, the school or college goals are: • Realistic and achievable • Aligned with mission • Provide framework for objectives • Communicated to all stakeholders • Broad stakeholder involvement	No school or college goals identified.	School or college goals are being developed to accomplish the University and/or school or college mission. These goals are administratively feasible in 3-5 years. Goals do not address or prioritize data identified in the weakness, opportunities or threats from SWOT.	School or college goals developed to accomplish the mission statement. These goals consider and are based on: • Rigorous analysis of the current state and operating landscape of the school (e.g., a SWOT) • Broad stakeholder involvement of faculty and staff, with	The school or college goals are well known among stakeholders and used to guide decisions. The goals are clearly aligned with the University themes and goals outlined in the Trajectory to Excellence & Campus Framework. Consideration given to students, faculty and staff in addition to core school or college functions. The goals are clearly linked to the school or college		

BUILT TO LAST/GOOD TO GREAT





Core Framework - S/C Name

Syracuse University

Core Value	Core Purpose	Numeric Tally	Notes
Students	Undergrad Learning		
	Undergrad Research		
	Grad Learning		
	Grad Research		
	Support (health/well-being, safety, advising)		
	Process Support (e.g. registration, payments)		
Faculty	Teaching		
	Research		
	Service		
	Support		
Staff	Development		
	Environment/Service/Process Support		
Economic Engine	Tuition		
	Research		
	Endowment		
	Efficiency (Process Improvement, Cost savings, Quality Improvement)		
	Costs		

CORE FRAMEWORK

ID CATEGORIZATION MODEL

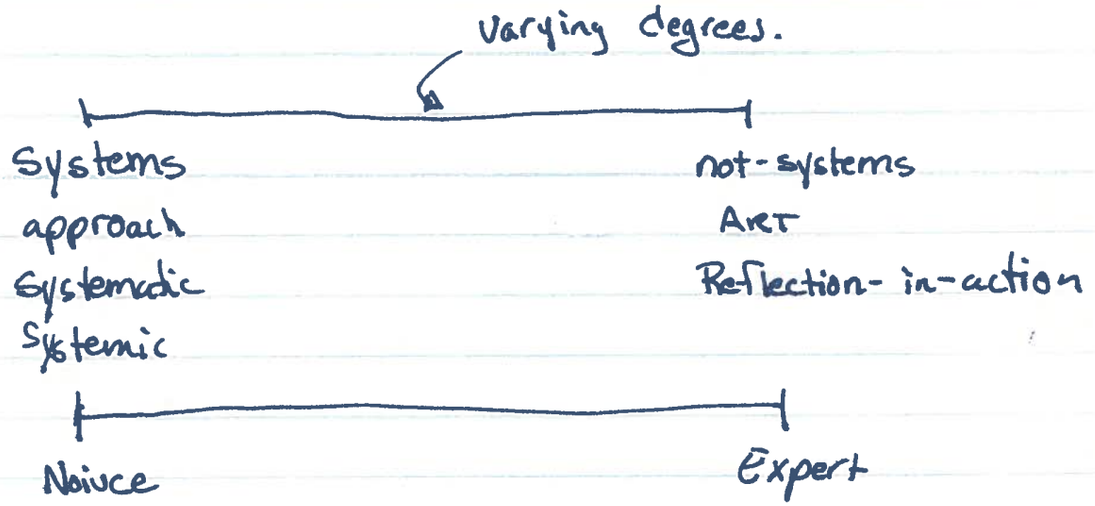
In IDE 722 we debated the systems approach to instructional design: ~~essentially~~ Must Do instructional design models be based on a systems approach? In thinking pondering this question I was stumped to ~~think of a way of approach~~ name an approach that did not employ a systems approach foundation. I had + was conceptualized a continuum with systems theory at one end, and non-systems at the other ($H_0: \mu_1 = \mu_2$, $H_1: \mu_1 \neq \mu_2$. we just passed through stats in 788).

I thought of a non-systems approach & felt this approach was more indicative of 'art" & reflection-in-action, ~~but then~~ I then asked myself was this the same difference between

Computers. The pace of

- Books of ID - only talk about ID in general & never differentiate

form, context, conceptual level or level of ID

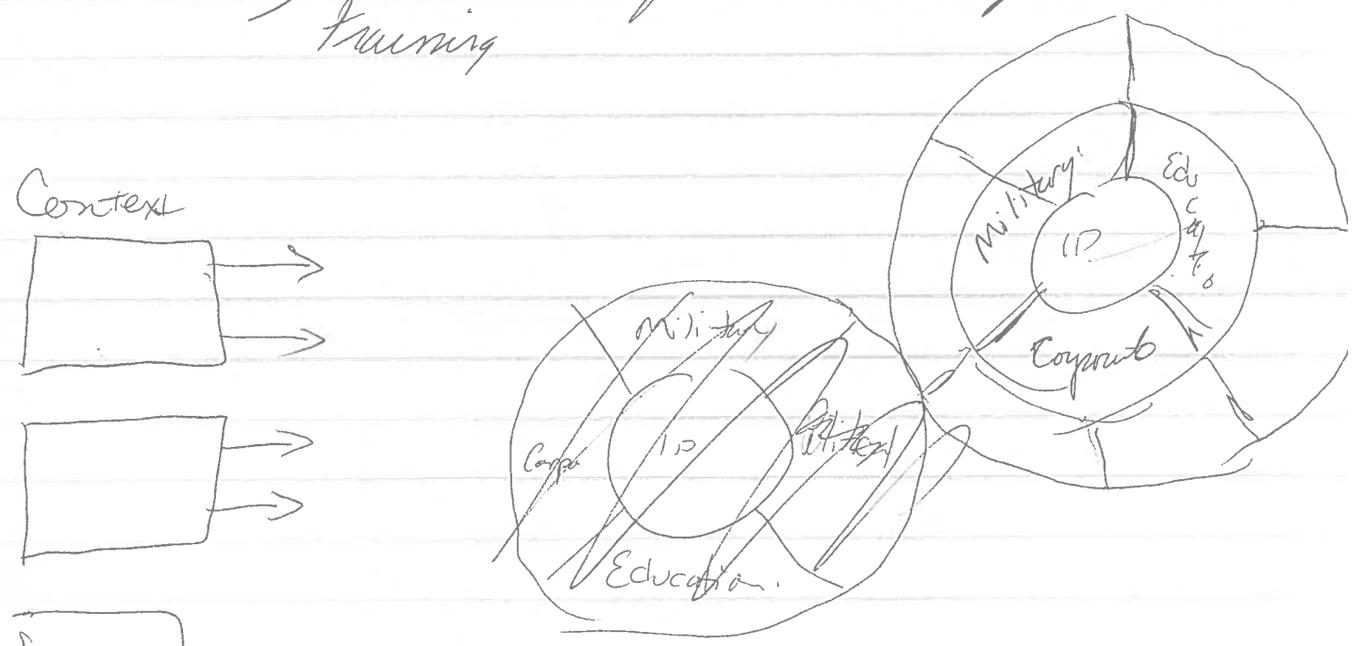


Problems w Andrews & Goodson

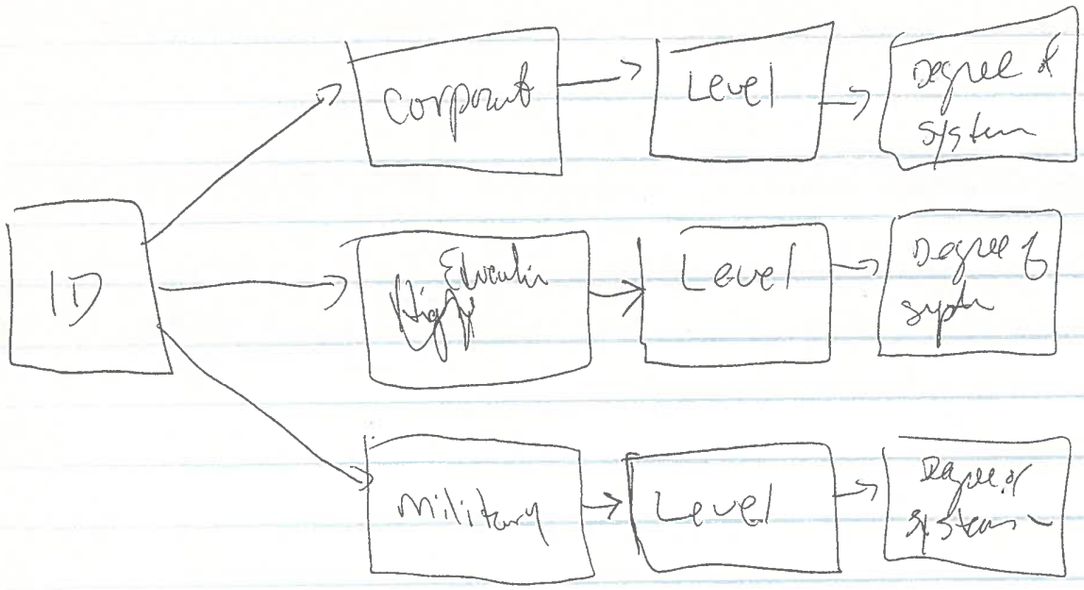
1. Some of the models were ~~evaluated~~ applied to contexts which they were not designed for

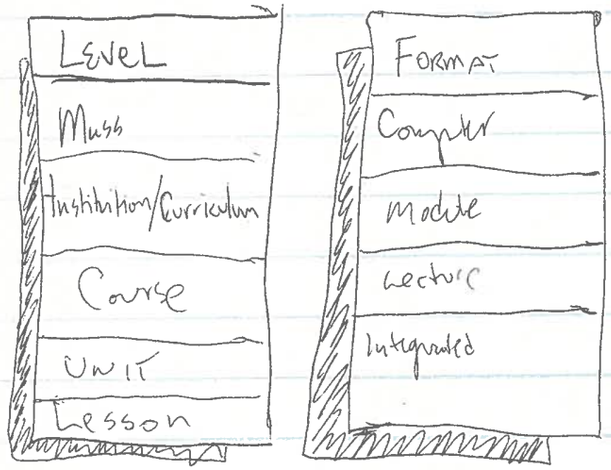
2. Some of the models are more applicable for experts to use than novices

3 Some models are meant to be used to design a unit, or specific lesson, or unit (more than one lesson) or a complete ~~training~~ training



Model to Evaluate ID Models





822

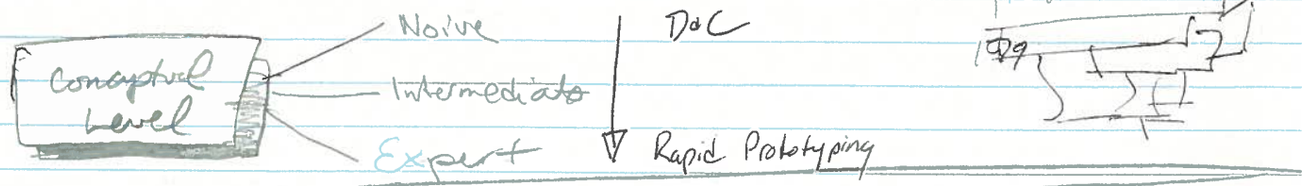
Model to evaluate ID models

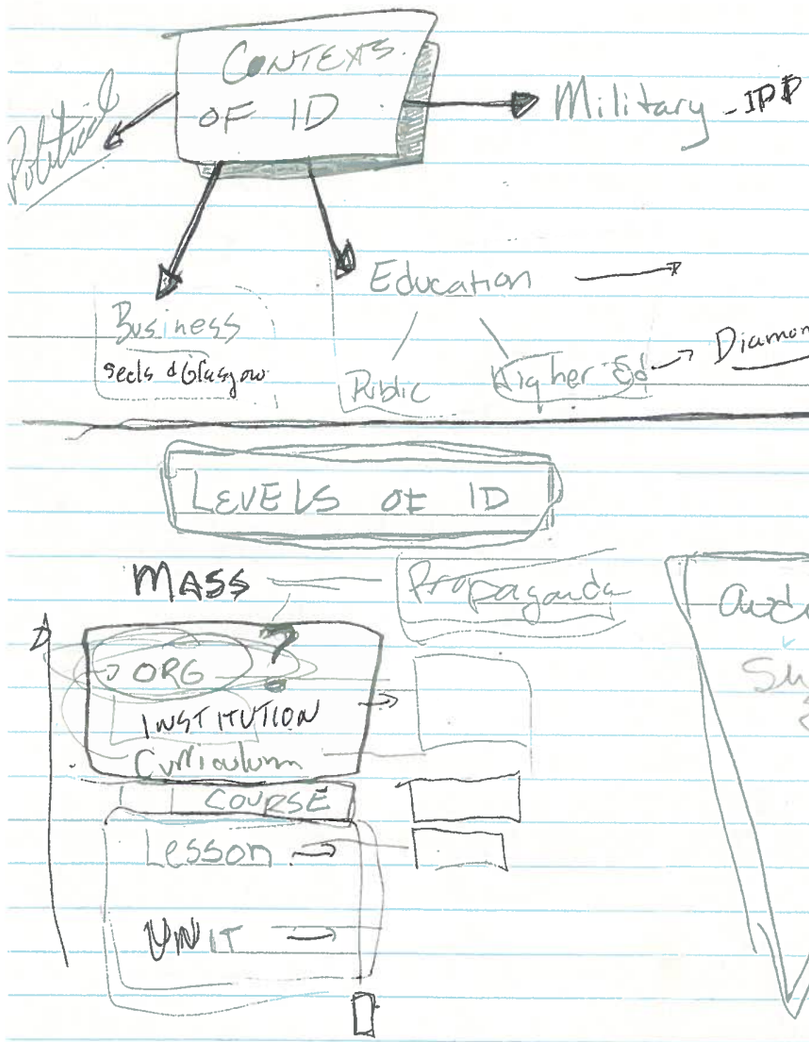
Conceptual Paper

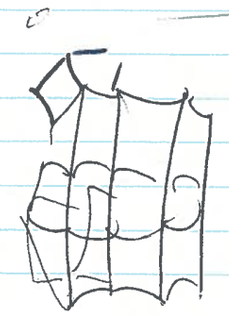
- Need a model to evaluate ID models

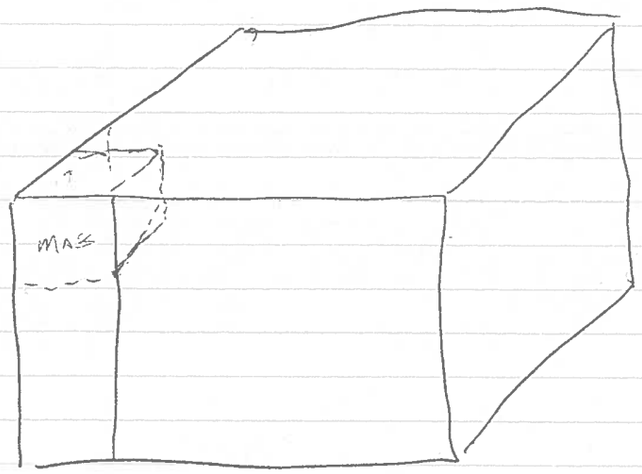
- define what instructional design is

Components of the model-



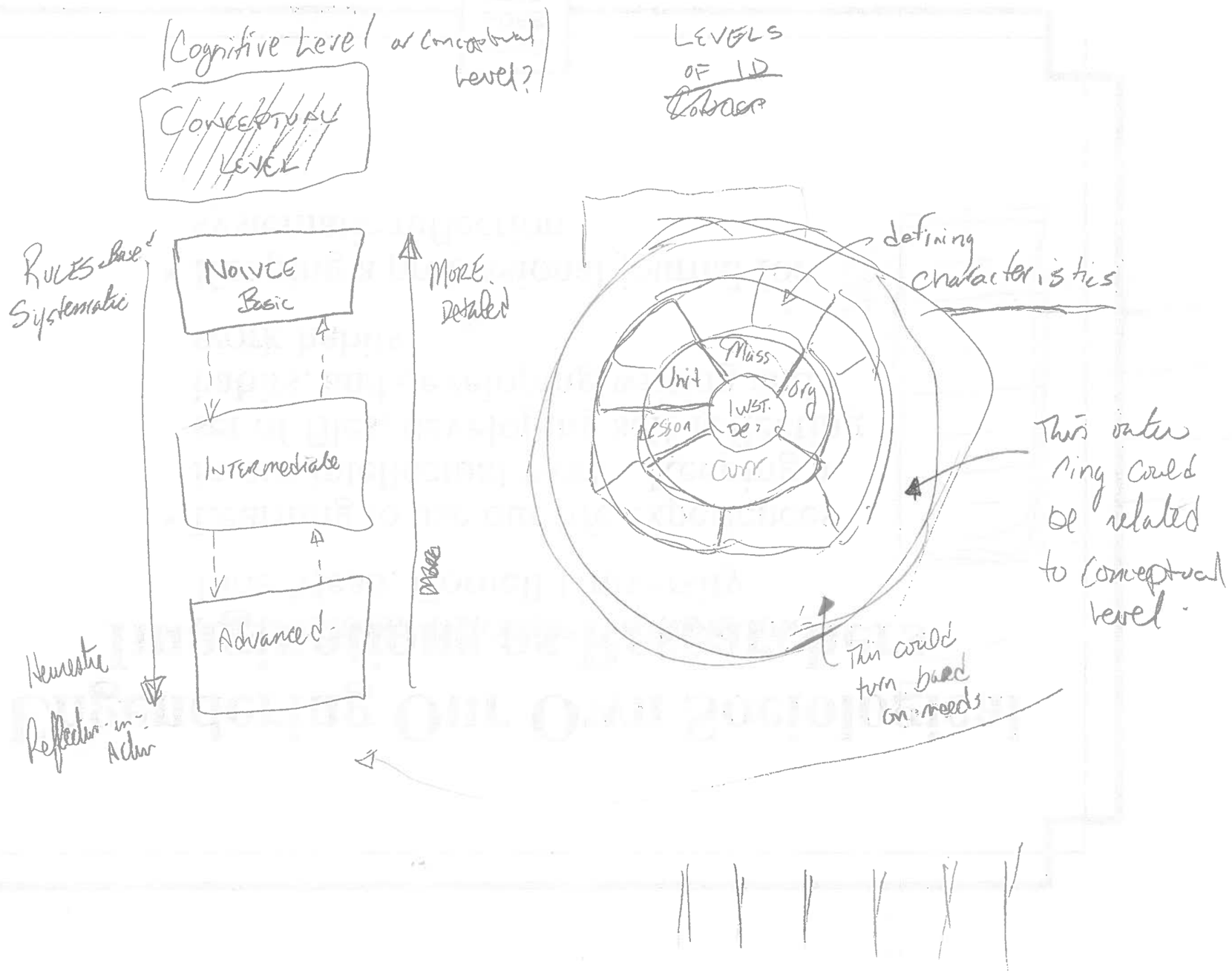


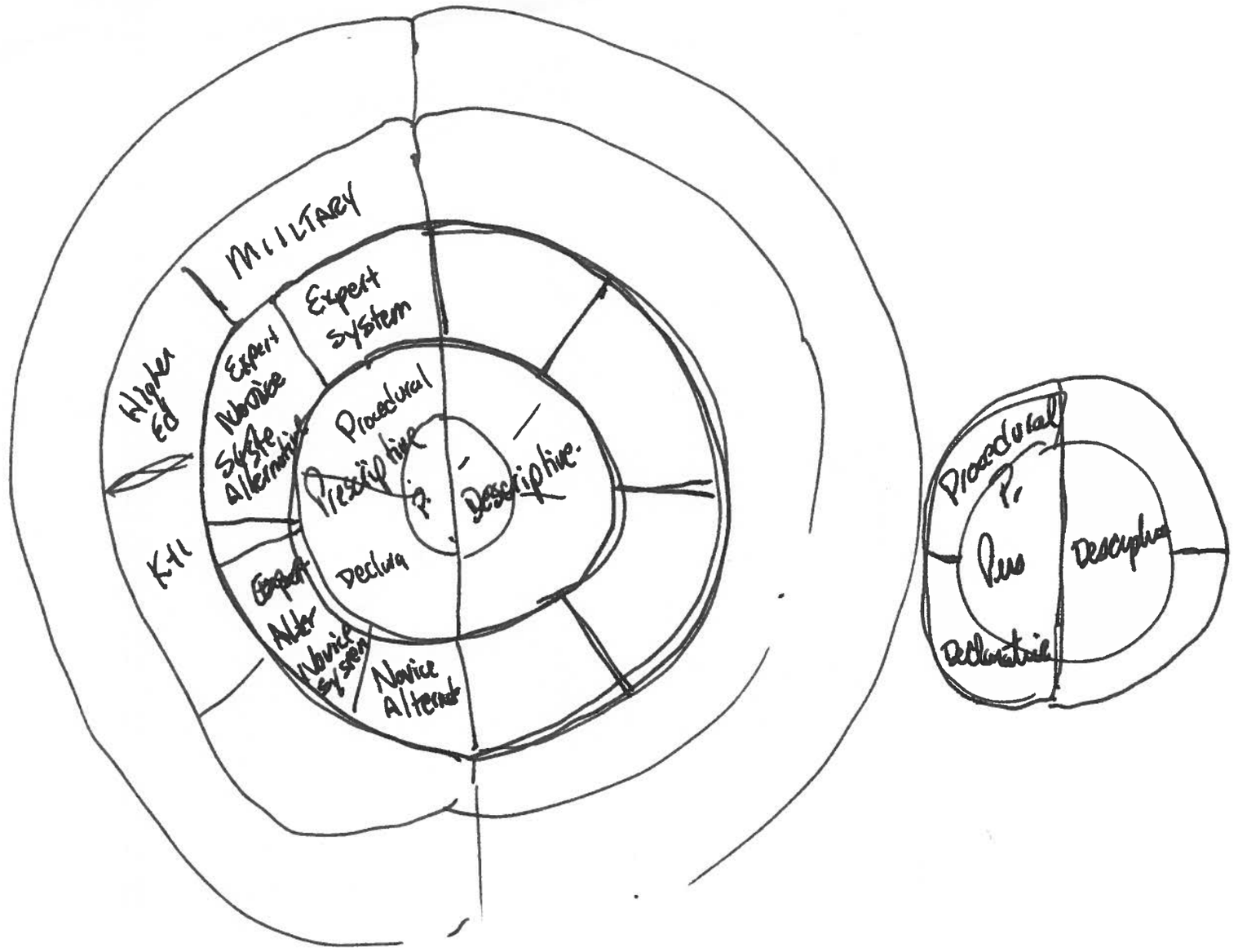



MASS

novices & experts?

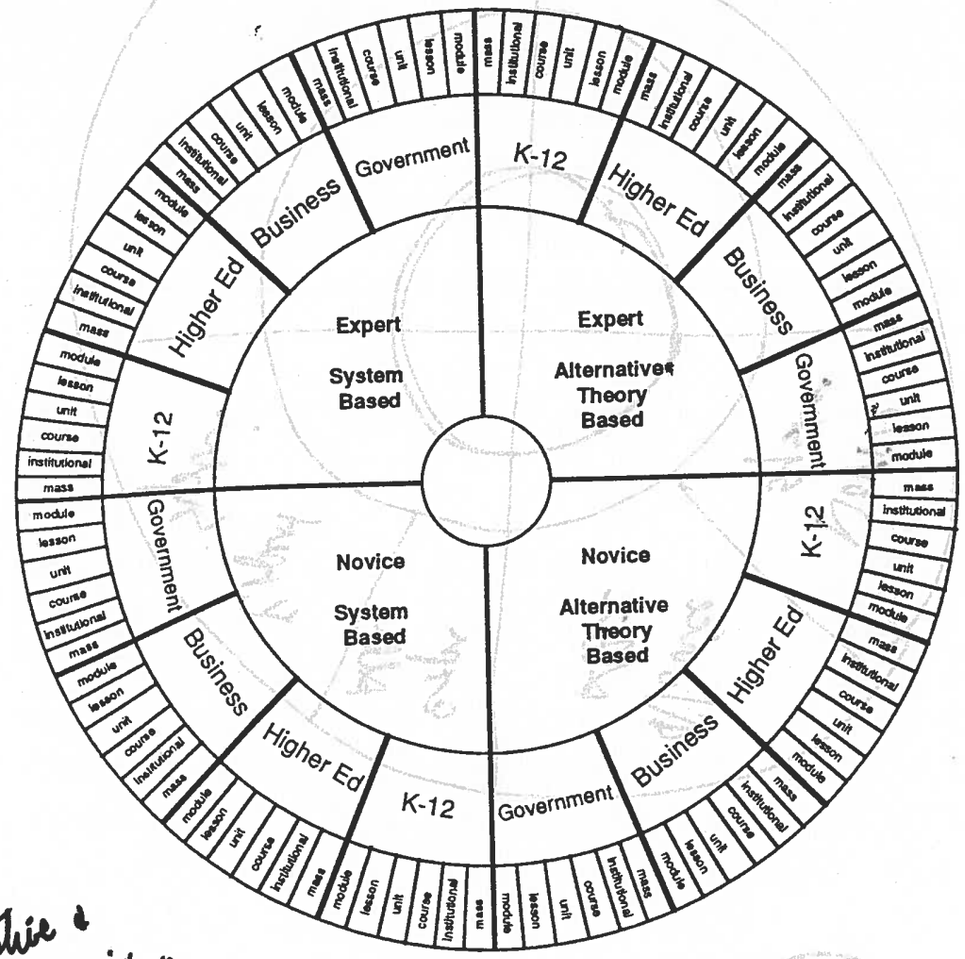
In reading about instructional design models, many articles & books focus on the process of design while ignoring the levels at which instructional design operates. Communication takes place at a mass, organizational, group & interpersonal levels. Could instructional design also be thought of as operating on different levels: mass, institutional, curriculum, course, ~~lesson~~ unit & lesson levels. Each level involves a different degree of design. ~~as well as~~ In addition to levels of instructional design the context in which design takes place affects the process & product of design.


Cognitive Level (or Conceptual level?)
LEVELS OF ID
CONCEPTUAL LEVEL
Rules base Systematic
NOVICE Basic
INTERMEDIATE
ADVANCED
MORE Detailed
Heuristic Reflective in Action
defining characteristics
Mass
Unit
Org
INST. DE
LESSON
CURR
This outer ring could be related to Conceptual level.
This could turn based on needs


MILITARY
Expert system
Higher Ed
Procedural
Prescriptive
Descriptive
K-12
Declarative
Novice Alternative
Procedural
Declarative

curriculum (BA in mathematics), course (calculus 256), unit (max-min problems), and lesson (derivatives), and module (f{x} sin, f{x} tan).

Some instructional design models are intended to design instruction for lessons, such as Rapid Prototyping, while other models such as IPISD (the whole 1200 pages) are intended to design instruction on an institutional level (US Army). The levels of ID represent a third dimension to class and context (Figure 5):



Need to add prescriptive & descriptive

Figure 5

November 17, 1992

reflective communication). Instructional design models are also intended to plan instruction for different levels of implementation depending on the size of the population targeted by the instruction. For example, *mass*-level instructional design might involve planning a global AIDS-awareness initiative or a national birth-control program; *institutional*-level instructional design might occur for all the professional training staff at Motorola University or for all

Figure 12 ☐ Categorization and contexts of instructional design models

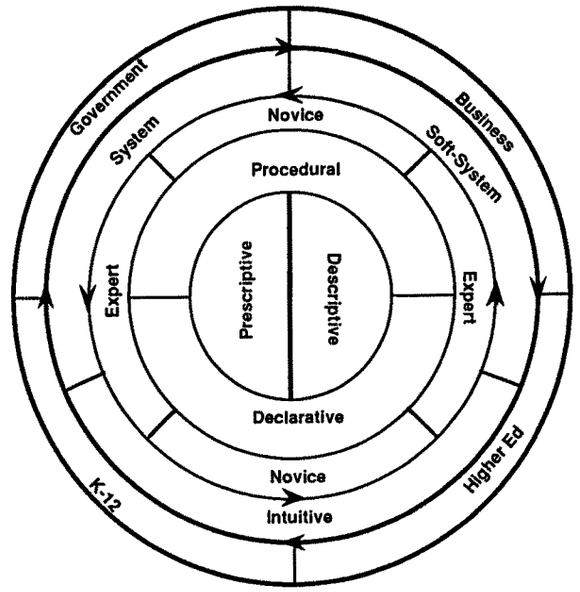
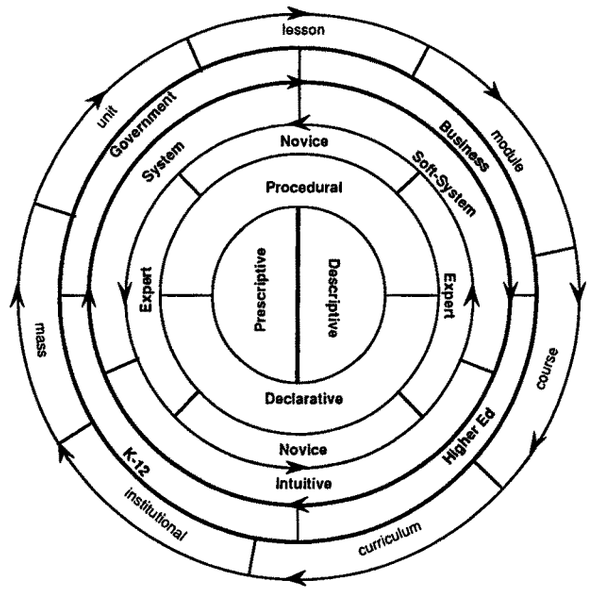


Figure 13 ☐ Conceptual framework for comparing instructional design models



ID Model	Classification									Context				Level					
	Prescriptive	Descriptive	Procedural	Declarative	Expert	Novice	System	Soft-System	Intuitive	K-12	Higher Ed	Business	Government	Unit	Module	Lesson	Course	Institutional	Mass
Dick & Carey	○	●	●	○	●	●	●	○	○	●	●	●	●	●	●	●	●	○	○
Rapid Prototyping	○	●	●	○	●	○	○	○	●	●	●	●	●	●	●	●	○	○	○
Layers of Necessity	○	●	●	○	●	○	○	●	◐	●	●	●	●	●	●	●	●	○	○
Diamond	◐	◐	◐	◐	●	○	◐	◐	◐	○	●	○	○	●	●	●	●	●	○
Romizowski	●	○	●	●	◐	◐	●	○	○	●	●	●	●	●	●	●	●	○	○
Gerlach & Ely																			
Dick & Reiser																			
Kemp																			
Van Patten																			
Leshin, Pollack & Regieluth																			
Bergman & Moore																			
IDI																			
Seels & Glasgow																			
														●		◐		○	
														Very much				Not at all	

Figure 10. Instructional design models comparison matrix

Table 2 ☐ Selected Instructional Design Models Comparison Matrix

ID Model	*Orientation*	*Knowledge Structure*	*Expertise Level*	*Structure*	*Context*	*Level*
Dick & Carey (1990)	B	A	D	A	A,B,C,D	A,B,C,D
Rapid Prototyping (1990)	C	C	A	B,C	A,B,C,D	A,B,C
Layers of Necessity (1991)	B	B	A,B	B	A,B,C,D	A,B,C,D,E,F
Diamond (1989)	C	C	A,B	B	B	A,B,C,D,E,F
Romizowski (1981)	A	B	A,B	D	A,B,C,D	A,B,C,D
Gerlach & Ely (1989)	A	A	D	A	A,B	A,B,C,D
Dick & Reiser (1989)	C	A	D	A	A	A,B,C,D
Kemp (1985)	C	C	D	B,C	A,B,C	A,B,C,D
Van Patten (1989)	A	A	QA,B	A	A,B,C,D	A,B,C,D,E,F
Leshin, Pollack & Reigieluth (1992)	C	A	A,B	A	A,B,C,D	A,B,C
Berman & Moore (1990)	C	A	C	A	C	E
IDI (1971)	C	A	C	A	A	A,B,C,D
Seels & Glasgow (1990)	C	A	C	A	A,B,C,D	D,E,F
IPISD (1975)	A	A	A	A	C,D	E
Chaos (1991)	B	B	A	A	A,B,C,D	A,B,C,D,E,F
Others						

	Orientation	*Knowledge Structure*	*Expertise Level*	*Structure*	*Context*	*Level*
	A. Prescriptive	A. Procedural	A. Expert	A. System	A. K–12	A. Unit
	B. Descriptive	B. Declarative	B. Intermediate	B. Soft-System	B. Higher Ed.	B. Module
	C. Elements of both	C. Elements of both	C. Novice	C. Intuitive	C. Business	C. Lesson
			D. Suitable for all	D. Aspects of each	D. Government	D. Course
						E. Institutional
						F. Mass