Analyzing Evaluation Data

Variables, Networks, and Transcripts

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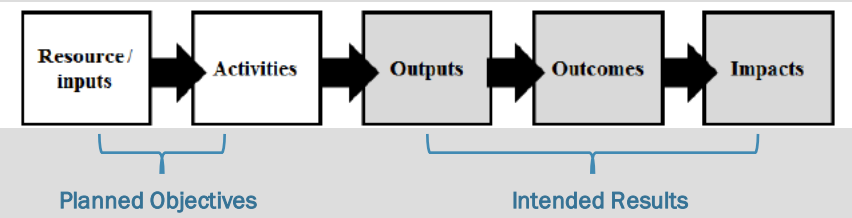
Depicting Evaluand: Logic Models

W. K. Kellogg Foundation Logic Model (WKKE, 2004)



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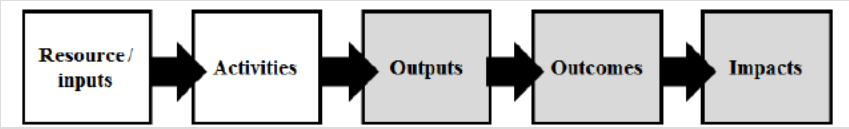
School at the Zoo



Zoo staff	Zoo visit	Integration	Engagement	College prep
Teachers	Reading	Inquiry-based learning	Achievement	
KY Standards	Writing		Motivation	
Curric. Dev.	Observation	Student ?s		
	Notes			
	Inquiry			

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School at the Zoo

Design: Mixed-methods case study*

- Observations
- Interviews w/ students, teachers, Zoo staff
- Document analysis
- Pre/post test
- Surveys w/students, teachers

*In this mixed-methods design, evaluators used a variety of data collection strategies concurrently to build up a broad picture of the impacts and experiences associated with the program.

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School at the Zoo

Paradigm: Primarily Pragmatic (hints of post-positivist + constructivist)

- Used a variety of methods contingent on the evaluation question
- Emphasis on how the program was used
- Some assessment of student learning (post-positivist)
- Some attention to stakeholder experiences (constructivist)

*In general, knowledge about use and context was privileged over experimental evidence of effectiveness and stakeholder-led transformation.

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School at the Zoo

Strengths of the Design:

- Wide variety of methods to address a wide range of questions
- Multiple forms of data allowed for triangulation of findings and additive findings (i.e., only accessible by combining sources of data)
- Incorporated prior research

Weaknesses of the Design:

- Pre/post test does not have a control group
- Assessment was not validated
- Survey items did not produce much variance (numerous responses > 90% agree)
- Analytic procedures included little synthesis across data sources
- Interview coding too granular

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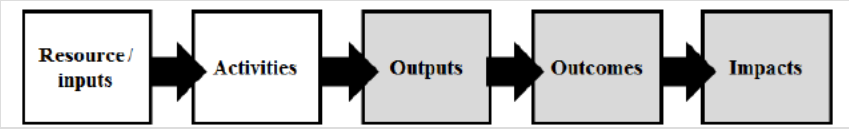
Student Support Services



Resource / inputs	Activities	Outputs	Outcomes	Impacts
Fed. Funding	Courses	Services	GPA	Change inst. climate
Personnel	Tutoring	Participation	Credits	Degree attain.
Programming	Counseling		Retention	
Physical space	Labs		Transfers	
	Workshops			
	Events			
	Disability services			

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Student Support Services

Design: Quasi-experimental, longitudinal

- Survey data collected from a random sample of projects
- Site visits
- Student records, transcripts, surveys

*In this quasi-experimental design, evaluators primarily used longitudinal, quantitative data collected from treatment and control students in order to estimate the causal impact of SSS.

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Student Support Services

Paradigm: Post-positivist

- Sought to assess the causal impact of SSS
- Primarily used quantitative data w/treatment and control groups (matching)
- Assessment of measured student outcomes (retention, transfer, degree completion)
- Evaluators and stakeholders are kept at a distance

*In general, experimental knowledge of inputs and outputs was privileged over the role of context, stakeholder experience, and transformation

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Student Support Services

Strengths of the Design:

- Matching approach allowed for comparison group and quasi-experimental situation
- Wide variety of estimation strategies (HLM, OLS) and use of covariate adjustment
- Large scale of study bolstered external validity
- Longitudinal allows for assessment of change over time

Weaknesses of the Design:

- Does not entirely control for selection bias (weak internal validity)
- No understanding of how context shaped use of services
- Data were collected under a dramatically different policy context than the present day (possible limited policy relevance)
- Student experiences are unknown making it difficult to know if results are likely to be replicated

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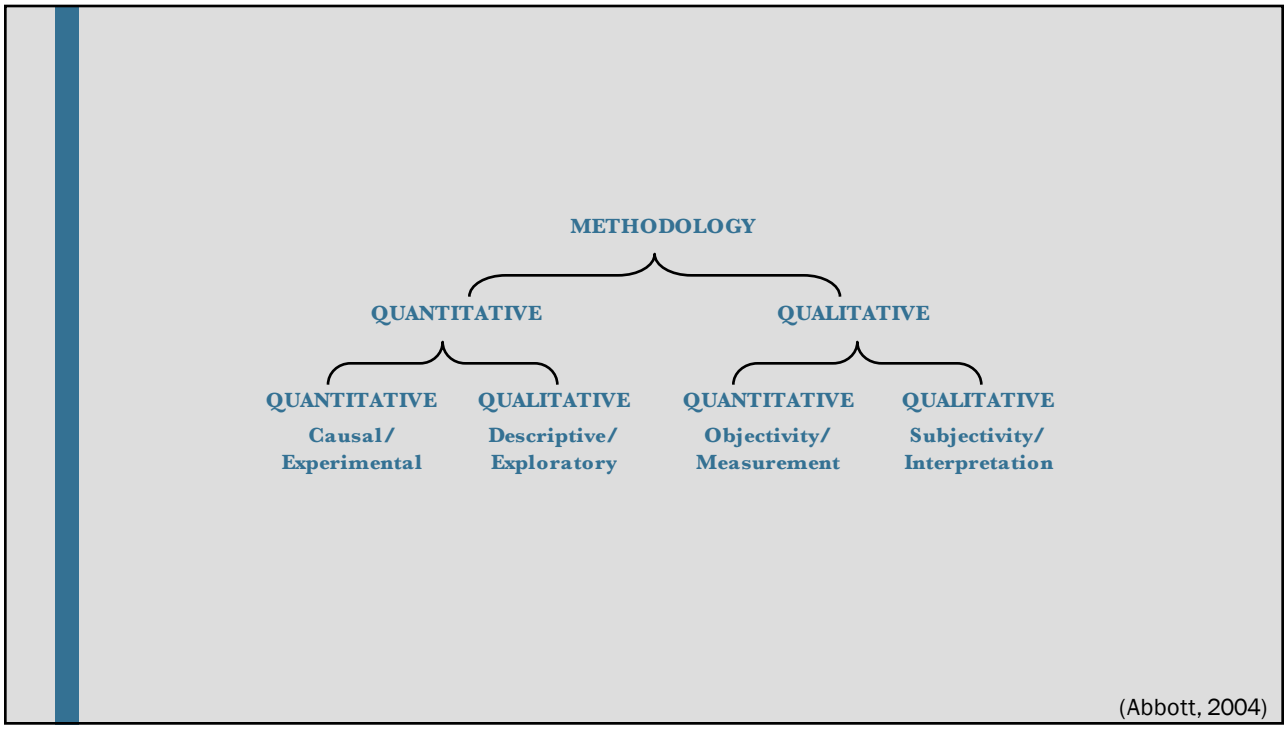
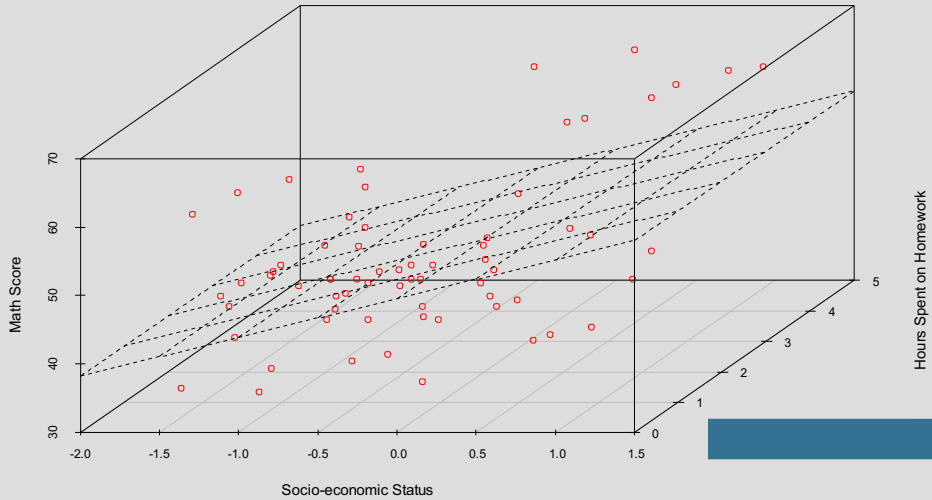


(Abbott, 2004)

$$Math_Score = \alpha + \beta_1(SES) + \beta_2(HW) + \varepsilon$$



Social Network Analysis (SNA)

SNA is a set of theories and methods for examining the structure, process, and meaning of sets of relationships between entities (i.e. networks)

Major assumptions (Wasserman & Faust, 1994, p. 4):

- "Actors and their actions are viewed as interdependent rather than independent, autonomous units
- Relational ties (linkages) between actors are channels for transfer or "flow" of resources (either material or non-material)
- Network models focusing on individuals view the network structural environment as providing opportunities for or constraints on individual action
- Network models conceptualize structure (social, economic, political, and so forth) as lasting patterns of relations among actors"

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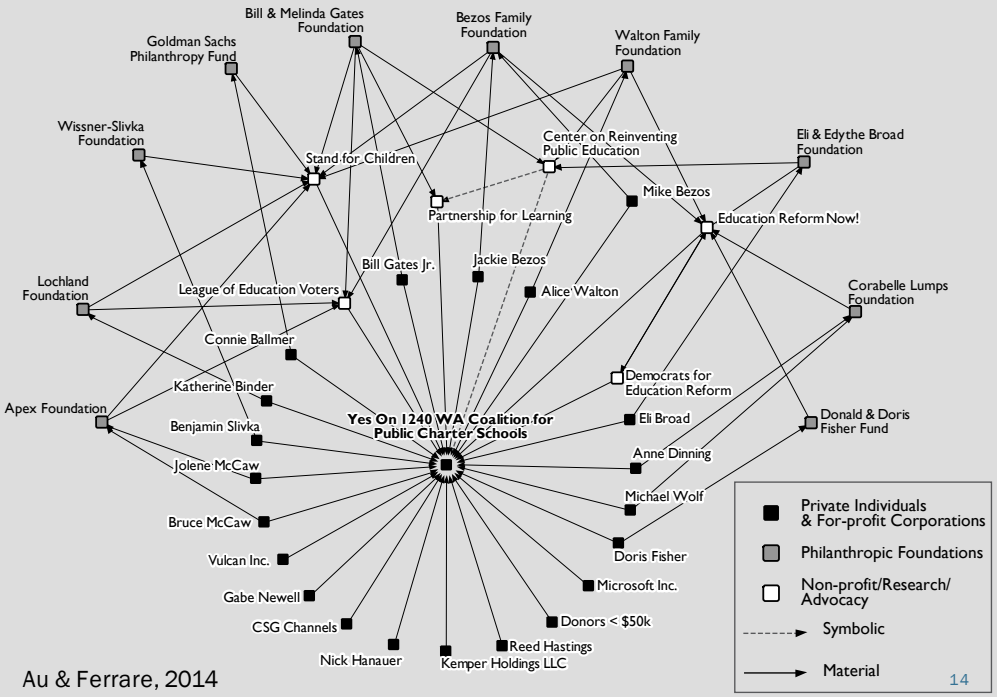

Au & Ferrare, 2014

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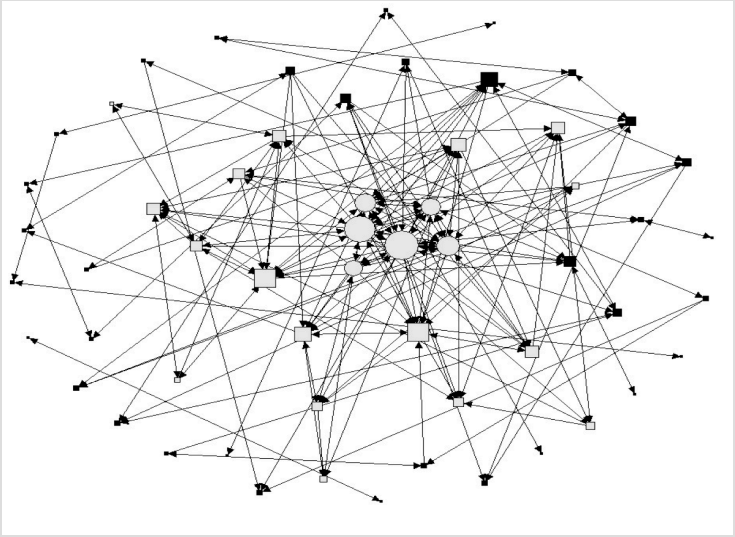
Multiple Relations



Often times we will measure multiple relations on the same set of actors. For example, Daly & Finnigan's (2009) **communication network** among district leaders

(Who do you communicate with in regard to work related tasks?)

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Key Concepts

Actor: discrete social units – individual (e.g., student), group (e.g., department), corporate (e.g., school)

- **Attributes:** characteristics of actors

Relational ties: links between actors

- Evaluative, resource exchange, membership, behavioral, etc.
- Similarities, relational roles, relational cognition, relational events (Borgatti et al. 2013, p. 4)

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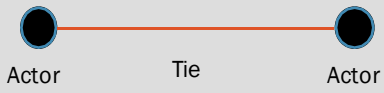
Fundamental Relational Forms

Dyad: A pair of actors and the possible ties between them

- Dyads are commonly the unit of analysis in SNA
- Even when nodes are the unit of analysis the measures of interest are usually dyadic



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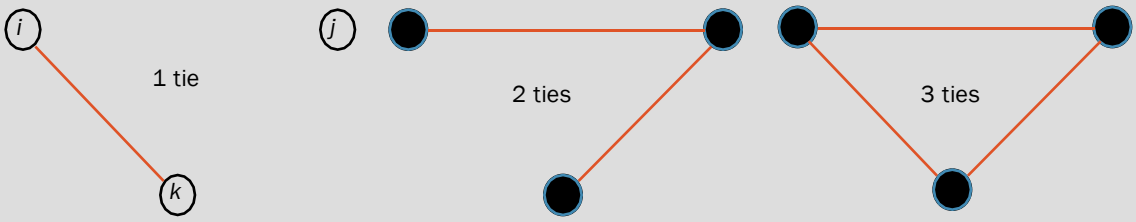
Fundamental Relational Forms

Triad: A subset of three actors and the possible ties between them

- Triads are of central theoretical importance in SNA
- Basis for studying transitivity and brokerage (among other things)



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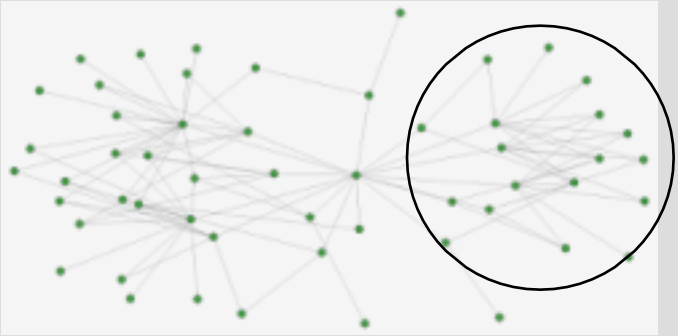
Fundamental Relational Forms

Subgroups: subsets of actors in a network and the possible ties between them (can be established *a priori* or in practice)



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Fundamental Relational Forms

Network: finite set of actors and the possible ties that define specified relations (or absence of relations) between them

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Levels of Analysis in SNA

Level	Outcome or process of interest (cf. Borgatti et al. 2013, p. 3)
Dyadic (Y_{ij})	Variation in relations between actors: e.g, Are educational advocacy organizations more likely to form policy coalitions if they share core beliefs in common?
Nodal (Y_i)	Variation in actors' practices based on their network activity: e.g., Are teachers more likely to adopt a pedagogic reform if they are connected to a central teacher in their school?
Network	Variation in network structures: e.g. Are sparsely connected policy networks more likely to produce innovative policy solutions than those that are more densely connected?

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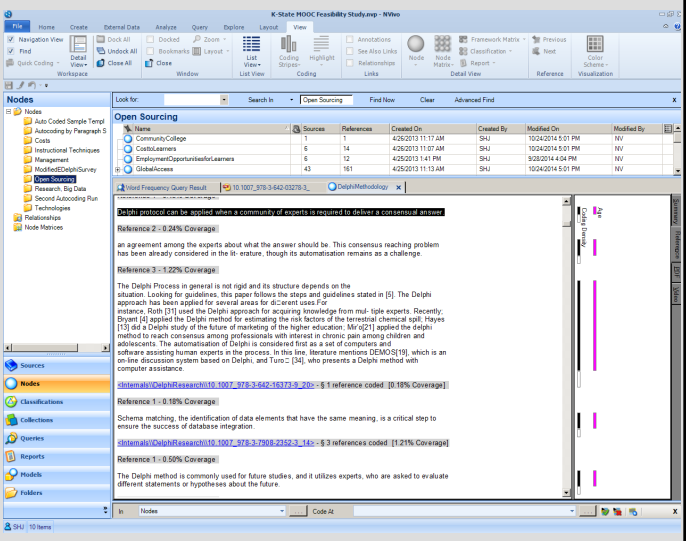
Transforming text into thematic codes

- Reduce the complexity of data
- Focus on storytelling
- First- v. Third-person explanations

"How do students best learn new concepts in science?"



"I know a lot of people who come in and will state the theorem … and prove it and then finally do some examples, and I never do that. **I do an example, and then I'll do another example, and as I do them I'll point out some feature and I'll say, "Well, we call this thing … Gauss-Jordan elimination…." I do a bunch of examples and then try to lead into the abstract definition.** But it doesn't seem like the most natural way to learn to me personally. I think you understand it abstractly. [W]hen you learn algebra, that's very abstract. You learn arithmetic—even numbers are abstract, right?… But eventually you learn that numbers are something and then in algebra you have to say let X be a number. So you have this variable, which is an abstraction of a number, and a number is an abstraction of something else … but you don't learn algebra until you've really learned arithmetic… Because then you have a bunch of examples of computations that you can imagine you would want to write in this language—and it keeps going like that. **[Y]ou always work from the particular to the general.**"

Ferrare & Hora, 2014

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"Views of learning" themes derived from the thematic analysis

Views of Learning	*n*	Description
Practice/Perseverance	22	Learning comes from prolonged effort in solving problems (often by oneself).
Application	14	Learning is best facilitated through active, hands-on engagement with the material (e.g., labs, field work).
Outside the classroom	14	The classroom is not the best venue for learning.
Articulating	13	Students learn best when vocally articulating their own thoughts, ideas, and problem-solving processes to others.
Variability	12	Students learn differently (e.g., visual, auditory, hands-on, etc.).
Visualizations	11	Students learn effectively when material is put into visual or physical form.
Construction	10	Students must actively develop their own understandings of the material.
Experiential	9	Learning is best facilitated when course material is explicitly linked to students' own experiences.
Scaffolding	7	Learning is best facilitated when course topics are presented in a sequential fashion from least to most difficult.
Clear Explanations	5	Learning is best facilitated through the clear explanation of topics.
Examples	4	Students learn from concrete examples and illustrations of course material.
Repetition	4	Students learn through repeated exposure to a topic or idea.
Osmosis	2	Students learn by being in the presence of an expert (i.e., an academic).
Individualized	2	Learning is facilitated through one-on-one interaction with an instructor.
Memorizing	1	Learning is accomplished through memorizing facts or computational rules.

Ferrare & Hora, 2014

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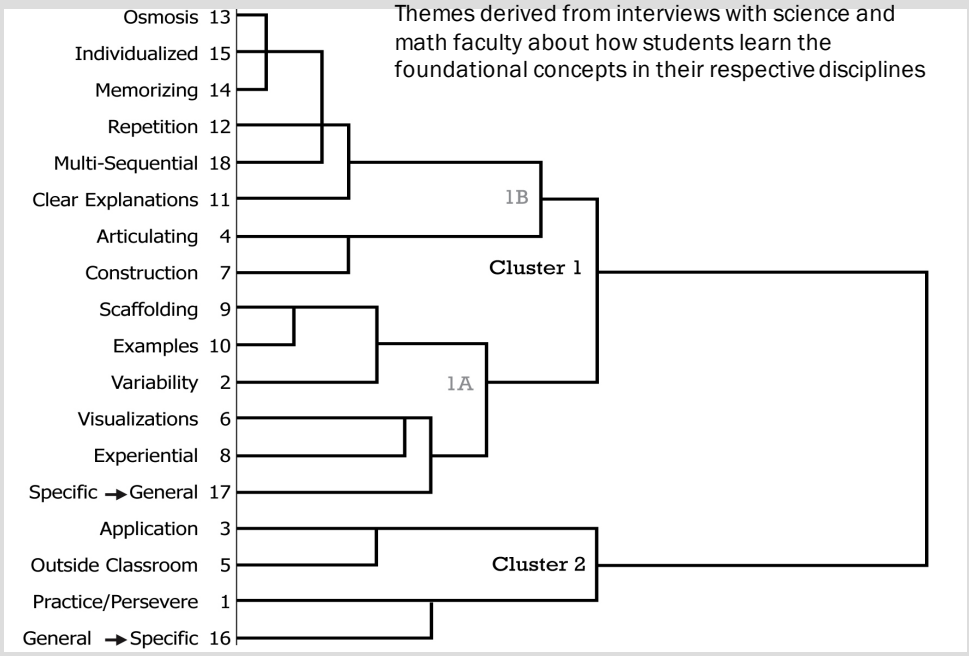

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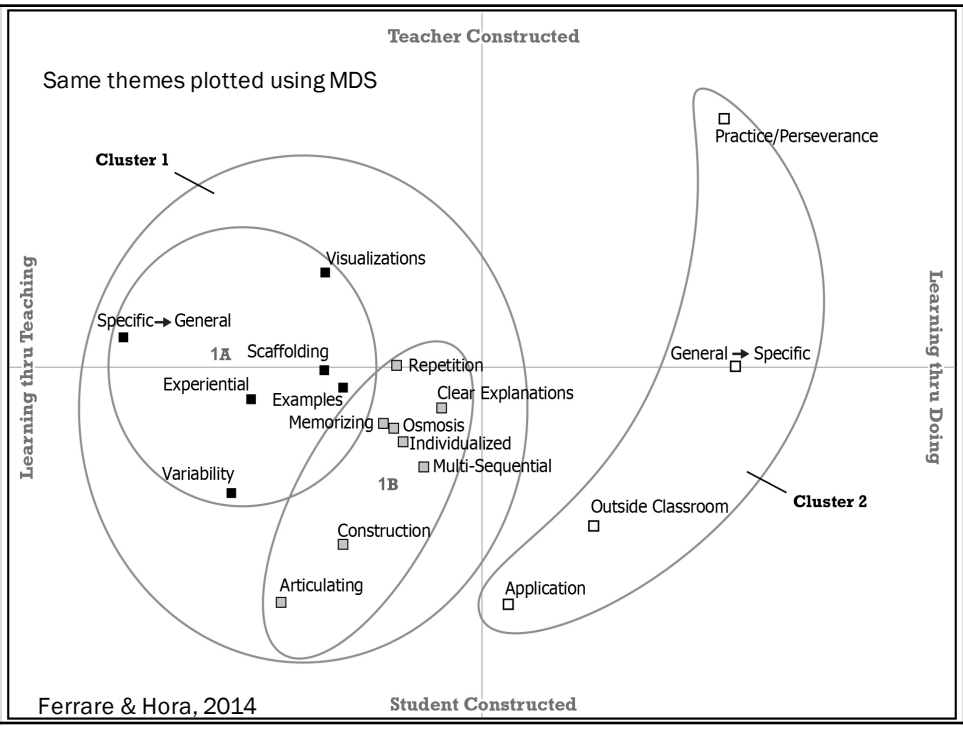

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Next Assign: Identifying Stakeholders, Questions, and Data Collection

1. Identify the range of stakeholders connected by your evaluand (~1 page)
   - Be as specific as possible
   - Discuss the different stakes
2. Give a general description of the type of evaluation (e.g., needs assessment, outcome-based) and design (e.g., quasi-experimental, mixed-methods) you will use to evaluate your evaluand (~1 page)
   - Discuss why this type and design is appropriate given the objectives of the evaluand
3. Pose a set of questions that will guide your evaluation (~1.5 - 2 pages)
   - Under each question, discuss why the question is important to your stakeholders (likely involves some assumptions – make those known)
   - Discuss the data collection strategies you will use to address each question and why they are appropriate to the question

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