

# Relating Teaching Behaviors to Cognition


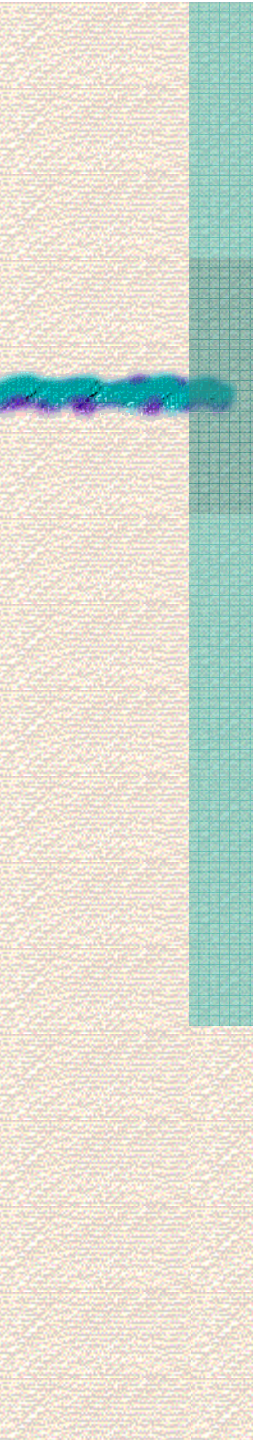
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# Current USA Educational Policy



- Driven by NCLB
    - Focuses on student performance
    - Accountability in the form of standardized tests
    - Highlighting Teacher Quality
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# Achieving Reform Efforts

Focus on the Quality of the teacher:

- Standards for teacher quality based on credentials
- Standardizing content area knowledge so that teachers are consistently presenting worthwhile information
  - *Common tests require common curricula; therefore, teachers need a shared knowledge-base about content*

# Discrepancy

- Common Content Knowledge-base for core K-12 subjects ...  
but
- No Universally Accepted Fundamental and Foundational Knowledge-base for the theory of teaching and learning

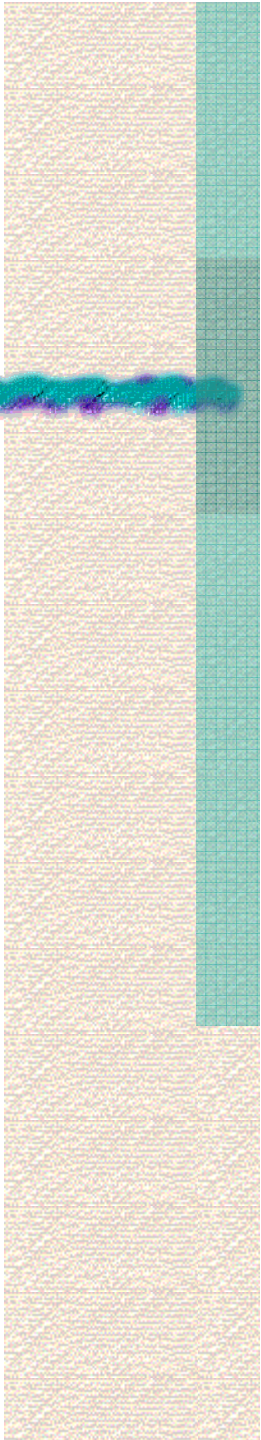

# Shared Terms...Lacking Common Definitions

- Cooperative Learning
- Social Constructivism
- Direct teaching
- Guided Discovery
- Feedback
- Cognition
- ....

# The **Big** Question



How does this lack of commonly accepted fundamental and foundational knowledge-base affect the profession?

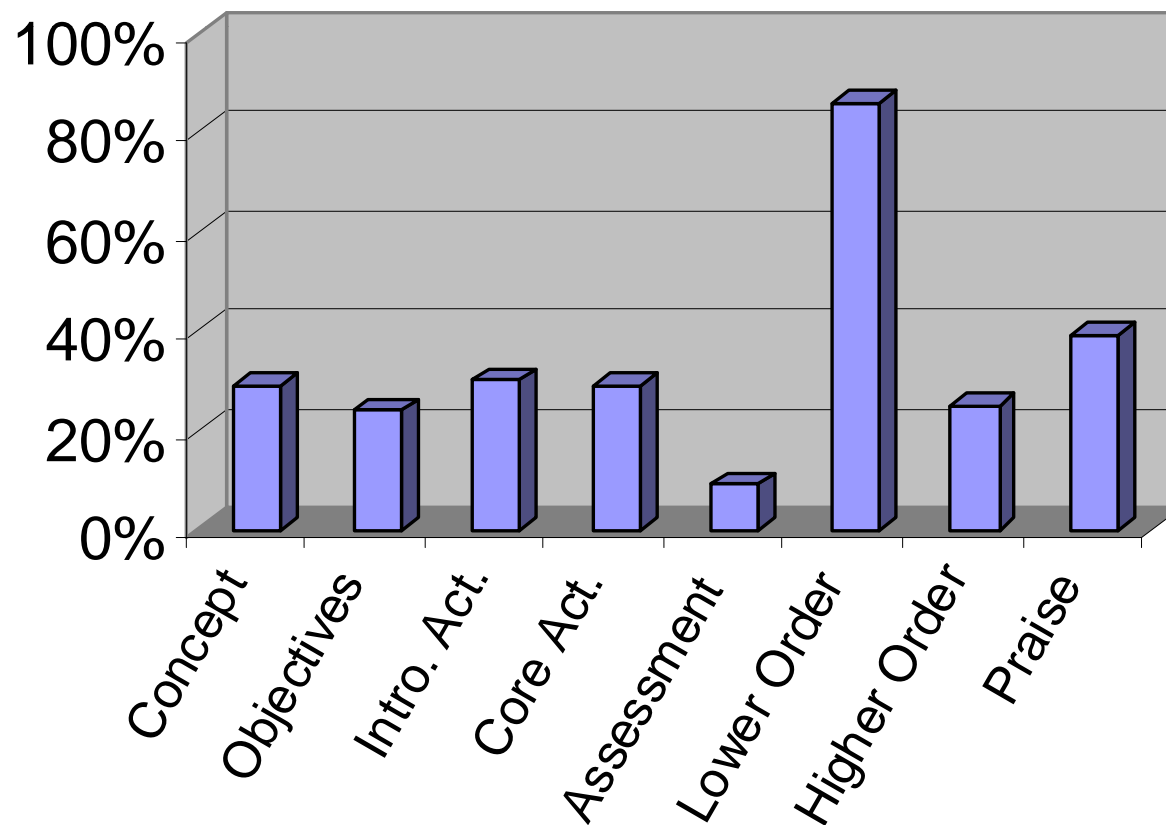


# Study # 1

- 3 year study
- Graduating student teacher candidates
- Program Knowledge Retention
- Performance Tasks:
  - Lesson plans
  - Activities
  - Assessment plans
  - Questions
  - Praise statements

# The Results? *Dismal*

*Percentage of Appropriate Responses per Task*



# Lower Order Questions

- **91%** were **knowledge** questions
- **8%** were **comprehension** questions
- **2%** were **application** questions
- **93%** required a short 1-3 word answer.

*\*Evaluated using Bloom's Taxonomy*

# *How can the results be dismal?*

- When....
  - Students constructed lesson plans in every core course
  - Every core course taught or reinforced the content in this study, including cognition
  - Students highly rated themselves as prepared and confident to teach

# *How can the results be dismal?*

- When....
  - Teacher Education has more honor students than all other departments combined
  - ALL students in this study had passed the credentialing requirements



# The Problem?

- Although every course reinforced the common lesson plan terms, the definitions and implementation practices were idiosyncratically presented
- There was no fixed or commonly agreed upon foundational or fundamental knowledge-base in teacher education program.

# The Future



*How would Education  
benefit from a non-  
idiosyncratic structure?*



# A Fundamental and Foundational Knowledge-base

- Provides a common language for professional dialogue, reliable research, and meaningful advancements
- Preserves knowledge rather than routinely discarding information
- Provides the framework for augmenting knowledge

# A Fundamental and Foundational Knowledge-base

- Provides a beginning level of competence that is essential to advanced knowledge and application
- Promotes a profession that is managed by its own constituents rather than outside sources—politicians, parents, private enterprise, etc.



***Fixed information is  
fundamental and foundational  
information***

***The Spectrum of Teaching Styles  
Offers fixed entry-level information***

# Content Intrinsic to Cognition

- Thinking is ubiquitous
- Three basic processes: memory, discovery, creativity
- General model for the flow of conscious thinking
- All questions have dominant and supportive cognitive operations

# Content Intrinsic to Cognition

- Thinking can be convergent or divergent
- Deliberate development of thinking skills requires awareness of the role of specific cognitive operations

# Content Intrinsic to Cognition

- Each cognitive operation has a discrete definition and word choices
- Questioning language has cognitive implications
  - Specific language or non-specific (ambiguous) language
- Different cognitive process require different wait time

# Next Step

*What must be done to have a common fundamental and foundational knowledge-base?*

**RESEARCH THEORY**

# Study #2

- Tested assertions made by the *Spectrum* about cognition
- Compared Cognitive Operation language in memory questions
  - **Specific vs. Non-Specific**

# Study #2

- Verify or Reject Mosston's *General Model for the Flow of Conscious Thinking*

- $S \rightarrow D \rightarrow M \rightarrow R$

- **S** = Stimulus (the trigger)
- **D** = Cognitive Dissonance (the need to know)
- **M** = Mediation (the search)
- **R** = Response (the answer or solution)

# Findings

- Specific CO Qs immediately accessed brain area associated with cognition and memory retrieval
- Non-specific CO Qs only activated neural activation (a state of information gathering rather than cognitive retrieval)
- While reading specific CO Qs brain activations occurred for encoding information into memory in order to facilitate retrieval later; suggesting..
  - Specific CO Qs require less processing for the retrieval of memory information
- Provides preliminary support for Mosston's initial theoretical conception and application details about cognition ( $S \rightarrow D \rightarrow M \rightarrow R$ )

# Summary

- **Study 1:** Prospective teachers are lost in confusion resulting from random and arbitrarily distributed knowledge within a teacher education program.
- **Study 2:** There is worthwhile fixed knowledge that provides students with foundational information.

# More Research

- Can foundational knowledge assist in the successful retrieval of information for novice (and experienced) teachers?
- Can the establishment of an accepted knowledge-base for education lead to improved K-12 student learning?

Improved Student Learning

**Requires Improved  
Teaching!**

***Are we ready for the  
challenge???***