Knowledge and Belief Change in Academic Development

Patricia A. Alexander[1], P. Karen Murphy[2], & Yuting Sun[1]

[1]College of Education, University of Maryland [2]College of Education, Pennsylvania State University

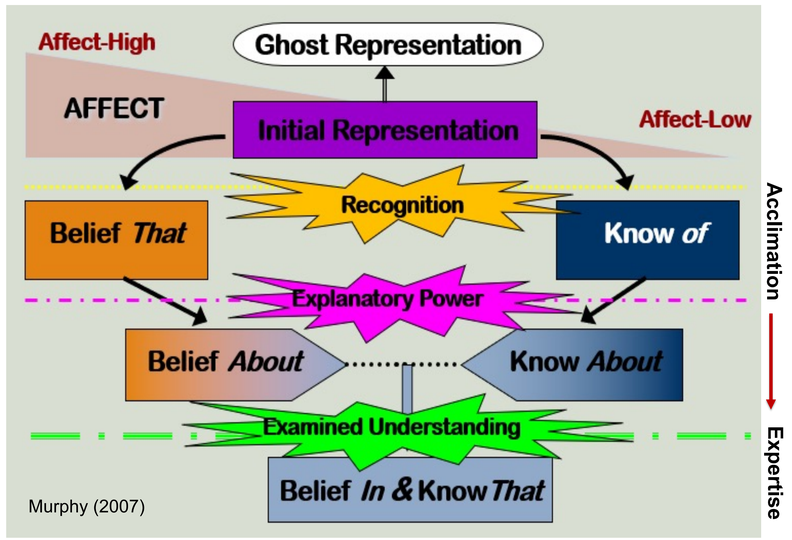
Introduction

- Delves into what it means to *know* something compared to *believing* it and how changes in knowledge and beliefs are critical to the process of academic development depicted in MDL.
- The interplay between knowing and believing is analyzed through the Characteristics of the Learner and Argument Integration Model (CLAIM; Murphy 2007; Murphy & Alexander, 2013).
- Discusses two areas of inquiry that speak to the interplay of knowledge and beliefs: *epistemic beliefs* and *conceptual change*.
- Discusses three orientations to pedagogical practice that promote knowledge and belief change: *persuasive pedagogy, relational reasoning,* and *quality talk.*

The CLAIM Framework

Characteristics of the Learner and Argument Integration Model

Explains *how* individuals move from the initial state where they ***believe that*** and ***know of*** (initial recognition), to a level where they ***believe about*** and ***know about*** (explanatory power), and finally to the level where they truly ***know that*** and ***believe in*** the idea being considered (examined understanding).



Epistemic Beliefs

- Individuals' epistemological stances must be complemented by epistemic competence.
- Students need to be explicitly taught about standards of evidence in a domain and conditions to which such standards apply.

Epistemological Stance

- A default system of beliefs about knowledge and knowing foundational to day-to-day operations, distinguished by varied means of knowledge justification.
- May be hard to change, but not impossible.

Epistemic Competence

- The ability to recognize and utilize the standards of evidence and justification in a domain.

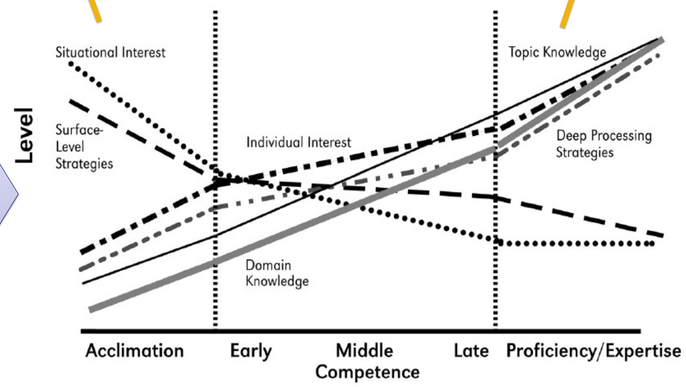
Conceptual Change

- Misconceptions are inevitable at all stages of academic development.
- The nature and frequency of misconceptions differ by stage, reflecting the interplay of knowledge, strategic processing, and interest and learners' level of knowing and believing at that stage.

- Many incomplete or malformed concepts
- Beliefs unexplored and unexamined
- Misconceived ideas tenacious due to limited knowledge, deep-processing strategies, interest, and no impetus to critical analysis

- Domain-specific concepts intricately intertwined and held with deep conviction
- Knowledge and beliefs closely aligned and well examined
- Must undergo dramatic shifts in the entire network of knowledge and beliefs

Articulates the "how" of MDL



Model of Domain Learning

Teaching for Changes in Knowledge and Beliefs

Persuasive Pedagogy

- Accepts learning as a change in students' knowledge, beliefs, and interests.
- Involves taking the argumentation structure and features of persuasive text and adapting them to the classroom.
- Values students' existing knowledge, beliefs, and interests
- Makes the content more intriguing and provocative, prompts students to consider alternative perspectives to instigate an examined understanding.

Relational Reasoning

- Ability to discern patterns in and forge relations between otherwise fragmented knowledge (Alexander & the DRLRL, 2012).
- Develop students habits of mind to consider if what they are learning is similar to (***analogical***), an unusual case of (***anomalous***), in opposition to (***antithetical***), or categorically distinct from (***antinomous***) what they already know or believe.
- Associated with performance in reading, science, mathematics, engineering, medical diagnosis, and nursing. Classroom based training underway.

Quality Talk

- A teacher-facilitated critical-analytic approach to discussion (Murphy et al., 2009; Wilkinson et al., 2010).
- Provide conditions for promoting quality discussions: use small, heterogeneous groups and shared control between teacher and students.
- Teachers model and scaffold discourse tools, e.g., authentic questions, uptake, and high-level thinking questions.
- Empirically shown to enhance student talk, which contributes to high-level comprehension of text and better learning outcomes in language arts (Li et al., 2016) and science (Murphy, Firetto, & Greene, 2016).