

# Belonging, Academic Rigor, and Conceptual Change Pedagogies: High Student Engagement & Learning

## Summary: Four strategies for belonging, rigor, and Conceptual Change

1. **Conceptual focus**, connecting concepts to prior knowledge or future career
1. **Active learning**
2. **Emotional engagement**: reduce negative emotions, stimulate positive emotions
3. **High expectations** coupled with scaffolding

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## Belonging

Belonging is an affective, holistic sense that is necessary prior to higher-level thinking; thus, if a student does not feel they belong or worse, experiencing bias or microaggressions, they will not be able to effectively learn.

Overwhelming evidence shows that emotion, motivation, and attention directly influence the amount and quality of learning.

- **Emotion facilitates deeper learning**
  - Emotion facilitates cognitive processing (Plass and Kalyuga, 2019; Micciche, 2007)
  - Emotion helps facilitate self-efficacy (Plass and Kalyuga, 2019; Garcia & deCaso, 2006)

- Emotions are interpreted (Eynde, Corte, & Verschaffel, 2006; Hoemann & Feldman Barrett, 2019). This means in some contexts, we need to help students re-assess common learning experiences (e.g., what “failure” means)
  - Capturing attention keeps the mind engaged (Lang, 2020; Quinlan, 2019)
  - **Negative emotions close off cognitive processing**
    - Stereotype threat or lack of belonging (García & de Caso, 2006; Dewsbury & Brame, 2019)
    - Anxiety (Cavanaugh, Moeller, 2021; Plass & Kalyuga, 2019)
  - **Classroom belonging improves performance:** self-efficacy, engagement, and motivation (Kirby & Thomas, 2022; Dewsbury & Brame, 2019). The positive effects of belonging are even stronger in non-majority students or other at-risk student populations.
  - **Non-majority students’ sense of belonging improves with structured collaborative learning,** not from informal in-class peer connections (Meeuwisse, Severiens & Born, 2010).
  - **Classroom climate improves belonging** and reduces loneliness (Gizier, 2019; Zumbrunn, McKim, Buhs, & Hawley, 2014; Gilken, & Johnson, 2019)
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## Rigor

1. **Create academic challenge that is equity-based:** Campbell, Dortch, & Burt (2018) express a broad definition of rigor: “academic challenge that supports learning and growth in students” and focuses on deep learning (p. 16). They then expand upon that understanding to define rigor as: “deep, inquiry-based and equity-based learning that sufficiently challenges and encourages all students to achieve their full potential, including both academic and broader development. In this way, we examine the process of learning that is rigorous—a learning process that questions modern problems and power structures (p. 16). Dwyer and Cardamone add flexibility as a core component of rigor, in support of equity-based approaches to learning.
2. **Focus students on deep learning:** Wyse and Soneral define rigor as: “learning meaningful content, with higher-order thinking, at the appropriate level of expectation in a given context” (Draeger et al., 2013, p. 268), leading to ownership of one’s learning (Bain, 2004). This definition can be broken down into four components: 1) learners engage in higher-level cognitive processes (Payne et al., 2005); 2) learners transfer concepts and content from scale or subdiscipline or between problems (Prosser and Trigwell, 1999); 3) learners engage in meaningful content (Jensen, 2005; Draeger et al., 2013); and 4) learners have appropriate levels of challenge and support (i.e., attainable expectations; Sanford, 1962; Graham and Essex, 2001).”

***Rigor means*** academic challenge with flexible support, creating the context for students' deep learning of meaningful content.

## Four characteristics of an academically rigorous course

### 1) *Meaningful content, focusing on concepts*

- a) Lower-level non-major courses focus on the larger, general concepts and how those concepts connect to students' lives.
- b) Upper-level courses include links between concepts and threshold concepts and on disciplinary meaning-making, deeper questions of why, or how the course prepares students for graduate school or careers.
- c) Strong student-faculty connection

### 2) *High expectations for all students*

- a) Mastery learning
- b) Higher-level reading and writing expectations along with scaffolding, clarity, and transparency (no "assumptions" built into assessments)
- c) Feedback on formative assessments to equip all students to meet summative assessments
- d) Higher student workload—books and articles
- e) Professor support

### 3) *Active learning*

- a) Connecting prior knowledge to current concepts
- b) Equipping students to take ownership of their learning
- c) Collaboratively solving problems
- d) Full engagement of mind, emotions—appeal to interests
- e) Highlighting the threshold concept experience—dissonance, shift in identity
- f) Build habits of mind

### 4) *Higher-order thinking*

- a) Analysis or synthesis; compare/contrast
- b) Argue positions, taking opposing perspectives or multiple perspectives
- c) Meta-cognition

d) Creating structures, organizing frameworks

Effect of rigor: increase in self-efficacy and motivation (Culver, Braxton, Pascarella, 2019).

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## Conceptual Focus Pedagogies lead to students' deep approaches to learning

- ***Shift from transmission pedagogies to conceptual change pedagogies:***
  - *Transmission-focused teaching* causes students' surface approach to studying: students tend to memorize information for a test and only engage in work that is on the test since students view learning as facts being transmitted from the teacher to the student.
  - *Learning-focused teaching* causes a moderately engaged approach to studying.
  - *Conceptual-change focused teaching* causes deep-learning approaches by students.

### Conceptual-change pedagogy

"This approach is one in which the teacher adopts a student-focused strategy with the intention of **helping students not only develop but also change their conceptions** of the phenomena they are investigating. The focus of student activity is on **students' restructuring their current world view** by interacting with subject material in a way that challenges their currently held conceptions, so that they restructure and change these conceptions" (Prosser, p. 786).

# Applying best practices in rigor, belonging, and conceptual-change learning

## Four strategies for belonging, rigor, and conceptual-change learning

2. *Conceptual focus*, connecting concepts to prior knowledge or future career
4. *Active learning*
5. *Emotional engagement*: reduce negative emotions, stimulate positive emotions
6. *High expectations* coupled with scaffolding

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