The Linkage Between Discourse and STEM Classroom Environment

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CDOP Background

- Active learning increases student-teacher interactions
  - This results in richer content discourse, such as teacher discourse moves (TDMs)
    - TDMs are conversational strategies used by instructors to help develop student understanding of content[1]
  - The Classroom Discourse Observational Protocol (CDOP) is a classroom observational protocol uniquely focused on Teacher Discourse Moves (TDMs) [2]
- Dialogic interactive discourse promotes students scientific reasoning
  - How dialogic interactive TDM frequency is affected by classroom environment is important because it influences student learning
- Due to lack of observations the relationship between TDMs and the environment in STEM classrooms is unknown

Research Questions

1. What are the patterns in Teacher Discourse Move usage?
2. How are teacher discourse moves influenced by factors such as tenure track, STEM discipline and, class size?

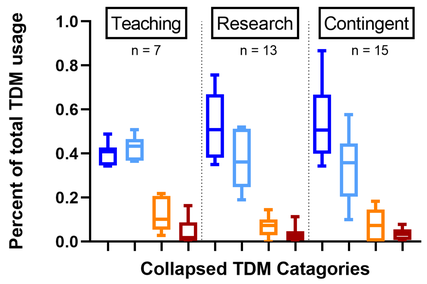
Methods

- <u>Classroom Discourse Observation Protocol</u>
  - Categorizes 17 TDMs into 4 categories
    - These are non-interactive authoritative, interactive authoritative, interactive dialogic, and other.
- <u>Teacher Population</u>
  - The data was collected from 35 instructors at a midsize public research-intensive minority serving institution
    - Professors fell under three tenure tracks, Teaching tenure, research tenure, and contingent
- <u>Classroom Observations</u>
  - Lectures were recorded from in-person Fall 2018 to Spring 2020 semesters
  - 1-3 Lectures were recorded per instructor
  - Classes were sorted by the number of students
    - small (<60), medium (60-100), Large (>100)
  - Classes were also sorted by discipline
    - Biology, Chemistry and, Other
      - Other is, Mathematics, physics, quantitative systems biology, environmental science and, environmental systems science

Teacher Discourse Move Trends in STEM

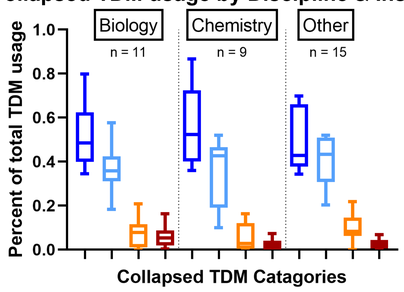
Non-Interactive, Authoritative | Interactive, Authoritative | Interactive, Dialogic | Other

Collapsed TDM usage by Tenure type & Instructor



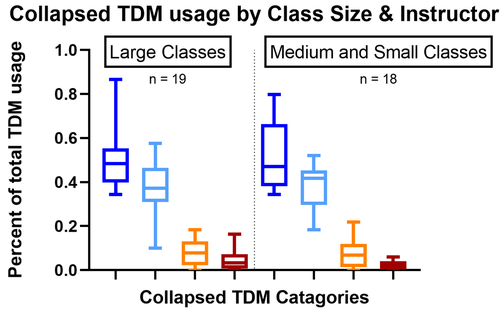
- Teaching professors tended to use interactive dialogic TDMs relatively often
- Research professors tend to use more interactive dialogic TDMs than contingent professors
- Contingent instructor had more authoritative TDMs than research professors

Collapsed TDM usage by Discipline & Instructor



- Biology professors tended to have more interactive dialogic TDMs than chemistry professors
- Chemistry professors' classes tended to be the most composed of non-interactive authoritative TDMs
- Classes in the other category had the most interactive dialogic TDM usage.

Collapsed TDM usage by Class Size & Instructor



- The trends across class size appear very similar
- Small & medium class sizes had the highest individual interactive dialogic percentage
  - Large classes appear to have slightly more interactive dialogic interactions overall
- Large classes also seem to have other discourse, primarily non content discourse, more often than smaller classes

Broader Implications of TDM Trends

- There is an apparent relationship between tenure track and the amount of interactive dialogic discourse that a professor engages in
- There appears to be a relationship with discipline and TDMs
- Contingent and chemistry professors more frequently use authoritative approaches than other professors
- Class size seems to have no significant relationships outside of other discourse, which could be due to increased logistical need
- Professors would benefit from using strategies that allow for more interactive dialogic discourse to occur

Resources

CDOP code definitions and a sample CDOP code matrix available by clicking the link below or by scanning the QR code to the right.
https://tinyurl.com/y5vs6m3h

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