Investigating the Impact of Faculty Learning Communities on Biology Instructors

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INTRODUCTION

Faculty Learning Communities (FLCs) to support faculty change
- Prior studies on STEM FLCs
- Five-year study: 19 participants at six research institutions

Automated Analysis of Constructed Response (AACR) facilitates student writing in large undergraduate classes
- Faculty members choose a question from a database
- Student responses analyzed by computer
- Discovers similarities and alternative ideas

FLCs support faculty using AACR questions and reports
- Face-to-face local monthly meetings
- Virtual meetings with FLCs at other institutions
- Initial face-to-face meeting for all FLC participants

Prior research supports the FLC model
- Extensive support for PD leads to lasting change
- FLCs are supported by AACR questions and reports

RESEARCH QUESTION

How does participation in an FLC impact instructors’ teaching practices and their conceptions of teaching and learning?

METHODS

Classroom Observation Protocol of Undergraduate STEM (COPUS) instructors’ teaching practices
- Online survey including the Approaches to Teaching Inventory
  - Initial conceptions of teaching and learning
  - Semi-structured interviews
    - Perceptions of the FLCs
    - Conceptions of teaching and learning

RESULTS

The Classroom Observation Protocol for Undergraduates STEM (COPUS) provides a systematic way to catalog observable behaviors of students and instructors (Smith et al. 2013, CBE Life Sci Educ., 12(4), 618-627)
- This is a descriptive tool: it captures behaviors and not content
- Trained observers mark a spreadsheet for all behaviors that occur in two-minute intervals
- To determine code prevalence: divide the total number of times a code is marked by the total number of two-minute intervals

CLASROOM OBSERVATIONS: COPUS

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<tr>
<th>Instructor Classroom Activity</th>
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Approaches to Teaching Inventory

- The Approaches to Teaching Inventory (ATI) is a 16-item survey (Trigwell & Prosser, 2004, Ed Psych Rev, 19(4), 409-424)
- Includes 16 statements
  - 4 Information transmission/teacher-focused (ITTF)
  - 4 Conceptual change/student-focused (CCSF)
- Participants completed the ATI via an online survey
- Participants responded to each item on a 5-point Likert scale: “very rarely” to “almost always”

INTERVIEWS

- Some of them are very excited about being able to pick apart multiple choice questions without really knowing what the subject was about...
- “I don’t want them to know cytoskeleton c is at this point in the electron transport chain, but I want them to understand in general terms how an electron transport chain actually generates ATP; you know, that sort of thing.” Andrew
- Assessment
  - Some of them are very excited at being able to pick apart multiple choice questions without really knowing what the subject was about...
  - “I don’t want them to know cytoskeleton c is at this point in the electron transport chain, but I want them to understand in general terms how an electron transport chain actually generates ATP; you know, that sort of thing.” Andrew

Overall Benefits of the FLC to Participants

- How to use AACR
  - “A lot of the meetings this last semester were going over how do you ask the question, sort of more of the basic stuff... if I have to do it in the future, I can see there’s more like... Okay, here is our report. What kind of ideas can we get to address these misconceptions?” Claire
  - Increased efficiency in changing teaching
    - “Having the FLC can make things go faster... we know that you’re talking about something pretty good, but it’s better when it goes this way and that’s something that I might have discovered five years later, but now I can just jump right through it and that kind of thing.” Tim
  - Community of biology teachers
    - “We kind of have a lot of the same issues with our students and it’s kind of a way to commiserate but also to learn about new things.” Ben

CONCLUSIONS

- This study allows us to establish a baseline description of the faculty who are participating in the AACR FLCs. Thus far, we can conclude the following:
  - Faculty have diverse approaches to and conceptions of teaching (COPUS, ATI, Interviews)
  - Faculty perceive that the FLC is critical to their use of AACR and potentially of great value to their teaching (Interviews)

Figure 1: The structure of the faculty learning communities (FLCs). Each box is a faculty participant and a yellow square represents a facilitator. Committed administrators offer support.

Figure 2: A table showing the percentages of time spent on different activities during course instruction, with data from Table 1.

Figure 3: A graph showing the percentage of time spent on different activities during course instruction, with data from Table 1.

Table 1: A table showing the percentage of time spent on different activities during course instruction, with data from Table 1.