

Inquiry Brief 3: Differences between IBL and Non-IBL Classroom Practices *First Findings from Observations of Classroom Activity, Leadership, and Questioning Behaviors*

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Aims of the Study

This study addresses our research question about classroom practice in courses designated IBL and how this may differ from classroom behavior in non-IBL classrooms.

Study Design

The data presented here is based on 125 total hours of observation of 20 different class sections at three campuses during fall and winter of 2008-09. Fourteen classes were IBL and 6 were non-IBL sections of the same course(s). Classes included introductory proof courses, advanced majors courses, and courses for pre-service teachers. Observers systematically recorded data on teacher and student classroom behavior, including class activities, participation and leadership, questioning behavior, student demographics, and overall classroom atmosphere.

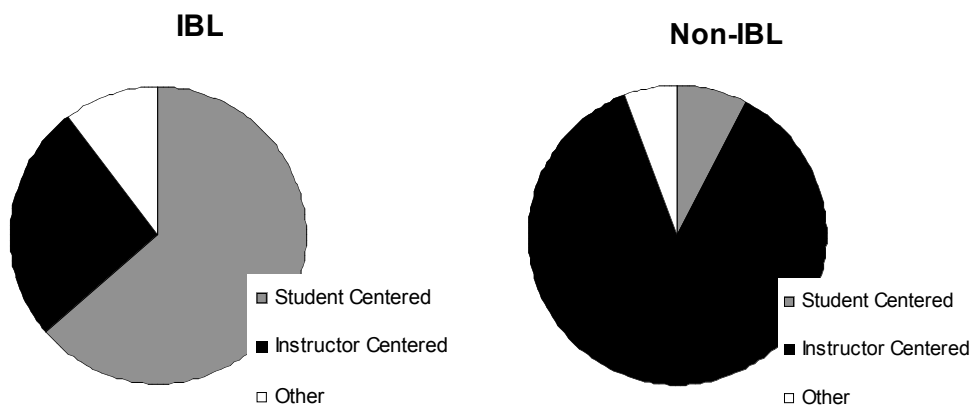
Findings

Classroom Activities

We saw meaningful differences in how class time was spent in IBL and non-IBL classrooms:

- IBL classes tended to include more student-centered activities including student presentations, discussion, group work and computer work (Figure 3-1). On average, IBL classes spent 64% of class time on these activities; non-IBL classes averaged 8%.

Figure 3-1: Proportion of Class Time spent on Student- or Instructor-Centered Activities



- IBL classes tended to switch between activities more frequently than non-IBL classes. For example, whole-class discussions broke out more than twice as often in IBL classes than in non-IBL sections. (See Table 3-1)

Lead Role

- More than half of the time, IBL classes were led by a student, group of students, or the class

as a whole. Non-IBL classes averaged less than 10% of time with someone other than an instructor in a leadership role.

- IBL faculty and TAs remained in the lead role for an average of 42% of class time.
- Classroom leadership also changed hands between instructors and students almost twice as often in IBL classes. Faculty took up the lead role most frequently (~4 times per hour).

Together, these findings suggest that, while IBL sections averaged significantly less time with an instructor in the primary leadership role than non-IBL sections, teachers were still strongly engaged and actively involved in shaping the trajectory of IBL courses.

Questioning Behavior

- The total number of questions asked in IBL and non-IBL sections was nearly identical (~44/hr of class time), including questions asked by both teachers and students.
- IBL *students* asked almost twice as many questions as did non-IBL students, thus accounting for a higher proportion of total questions asked.
- IBL students were three times more likely to ask multiple questions in the same class period.
- A higher proportion of individual IBL students tended to ask questions during any given class period than non-IBL students did

In other words, more IBL students asked questions *and* IBL students asked more questions—both as a population and as individuals. These measures point toward greater overall student participation in IBL classrooms.

Table 3-1: Key Indicators of Classroom Practice in IBL and Non-IBL Classrooms

<i>Mean...</i>	IBL	Non-IBL
... proportion of class time spent on student-centered activities (Presentation, group work, discussion or computer activities)	64%	8%
... proportion of time with students or whole class in lead role	58%	4%
... proportion of time spent in discussion (3+ participants)	12%	3%
... number of unique instances of discussion per hour of class time	1.2	0.5
... proportion of questions asked by students	25%	14%
... number of questions per hour asked by students	10	6
... number of questions per hour asked by repeat students*	4.5	1.5
... proportion of students who asked questions per class period	34%	5%

* *Repeat student* refers to a student who previously asked one or more questions in the same class period.

Limitations of the Study and Future Plans

- This data set currently includes only 20 sections and was limited to three campuses. The non-IBL data set is smaller than desirable for strong comparisons.
- Further analysis of observation data will address patterns in the cognitive level of questions, gender and ethnicity of participating students, and overall classroom atmosphere.
- Statistical tests for significance have not yet been performed on these analyses.
- We also aim to identify the linkages between observation data and student survey responses.