

# 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.

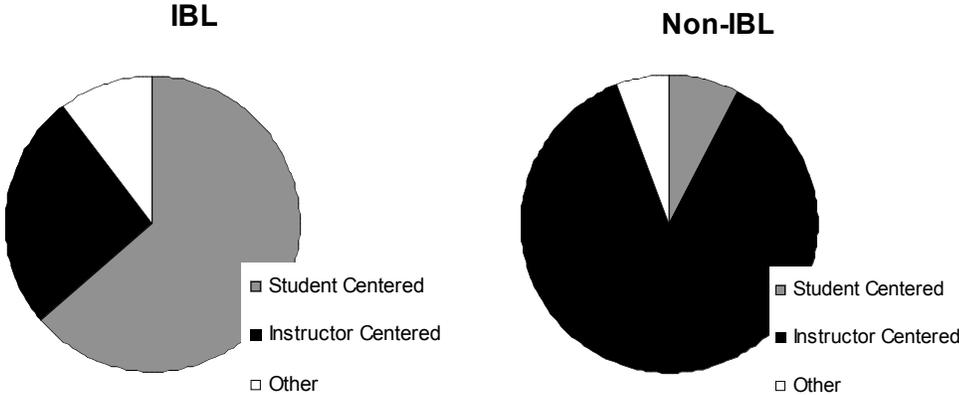
### Findings

#### 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>	<b>IBL</b>	<b>Non-IBL</b>
... 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.