



# **The Classroom/Laboratory Observation Protocol for Undergraduate STEM (COPUS/LOPUS)**

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# Difference between LOPUS & COPUS Observational Protocols

- COPUS does not capture the nature of students' and instructors' verbal interactions (e.g., discussions of concepts underlying the experiment, data analysis, or procedures to setup equipment), which may serve as indicators of the students' level of cognitive engagement
- LOPUS captures both students' and TAs' behaviors every 2 min as well as initiators of verbal interactions and the nature of these verbal interactions (Velasco, et al., 2016).

A pair of black-rimmed glasses is placed on an open book with a red cover. The background is dark and slightly blurred, focusing attention on the text.

## **LOPUS is a segmented protocol that characterizes**

- (1) instructional behaviors without a priori criteria of quality,
- (2) students' and TA's behaviors,
- (3) the extent and initiator of verbal interactions between students and TA, and
- (4) the nature of the content being discussed during these verbal interactions (Velasco, et al., 2016 ).

# Tips

- Document date, time, course title,
- Fill out a new row in the observation protocol at every 2-min interval
- Use either your cell phones set to count time up or a sand timer.
- Use the comment section if confused about an action.





# COPUS

## 1. Students are Doing

- L** Listening to instructor/taking notes, etc.
- Ind** Individual thinking/problem solving. Only mark when an instructor explicitly asks students to think about a clicker question or another question/problem on their own.
- CG** Discuss clicker question in groups of 2 or more students
- WG** Working in groups on worksheet activity
- OG** Other assigned group activity, such as responding to instructor question
- AnQ** Student answering a question posed by the instructor with rest of class listening
- SQ** Student asks question
- WC** Engaged in whole class discussion by offering explanations, opinion, judgment, etc. to whole class, often facilitated by instructor
- Prd** Making a prediction about the outcome of demo or experiment
- SP** Presentation by student(s)
- TQ** Test or quiz
- W** Waiting (instructor late, working on fixing AV problems, instructor otherwise occupied, etc.)
- O** Other – explain in comments

## 2. Instructor is Doing

- Lec** Lecturing (presenting content, deriving mathematical results, presenting a problem solution, etc.)
- RtW** Real-time writing on board, doc. projector, etc. (often checked off along with Lec)
- FUp** Follow-up/feedback on clicker question or activity to entire class
- PQ** Posing non-clicker question to students (non-rhetorical)
- CQ** Asking a clicker question (mark the entire time the instructor is using a clicker question, not just when first asked)
- AnQ** Listening to and answering student questions with entire class listening
- MG** Moving through class guiding ongoing student work during active learning task
- 1o1** One-on-one extended discussion with one or a few individuals, not paying attention to the rest of the class (can be along with MG or AnQ)
- D/V** Showing or conducting a demo, experiment, simulation, video, or animation
- Adm** Administration (assign homework, return tests, etc.)
- W** Waiting when there is an opportunity for an instructor to be interacting with or observing/listening to student or group activities and the instructor is not doing so
- O** Other – explain in comments



2-430 [redacted] N=13

CLASSROOM OBSERVATION PROTOCOL FOR UNDERGRADUATE COURSES (COPUC)

1. What are the Students Doing?

	L	Ind	CG	WG	OG	An Q	SQ	WC	Prd	SP	TQ	W	O	Comments
0-2 min.	✓	✓												
2-4	✓													
4-6	✓													
6-8	✓													
8-10	✓						✓							
10-12	✓						✓							
12-14	✓						✓							
14-16	✓						✓							
16-18	✓					✓								
18-20	✓													
20-22	✓													
22-24	✓													
24-26	✓				✓		✓							
26-28	✓				✓		✓							
28-30	✓													
30-32	✓													
32-34	✓													
34-36	✓	✓				✓	✓							
36-38	✓					✓	✓							
38-40	✓					✓								
40-42	✓													
42-44	✓													
44-46	✓							✓						
46-48	✓							✓						
48-50	✓							✓						
Total=	25	2		2		6	5							Totals= 40
%	62.5	5		5		15	12.5							100

2. What is the Instructor Doing?

	Lec	RW	FuF	PQ	AnQ	MG	1o1	D/V	Ad m	W	O	Comments
0-2 min.	✓			✓					✓			
2-4	✓			✓								
4-6	✓			✓								
6-8	✓											
8-10	✓				✓							
10-12	✓			✓	✓							
12-14	✓											
14-16	✓											
16-18	✓			✓								
18-20	✓											
20-22	✓											
22-24	✓											
24-26	✓			✓	✓							
26-28	✓			✓	✓							
28-30	✓							✓				
30-32	✓											
32-34	✓											
34-36	✓			✓	✓							
36-38	✓				✓							
38-40	✓			✓								
40-42	✓			✓								
42-44	✓			✓								
44-46	✓			✓	✓							
46-48	✓											
48-50	✓								1.6	1.6		
Total=	24		1	12	4				1.6	1.6		Total= 43
%	69.9		1.6	19	6.3							100



2-430 [redacted] N=13

CLASSROOM OBSERVATION PROTOCOL FOR UNDERGRADUATE COURSES (COPUC)

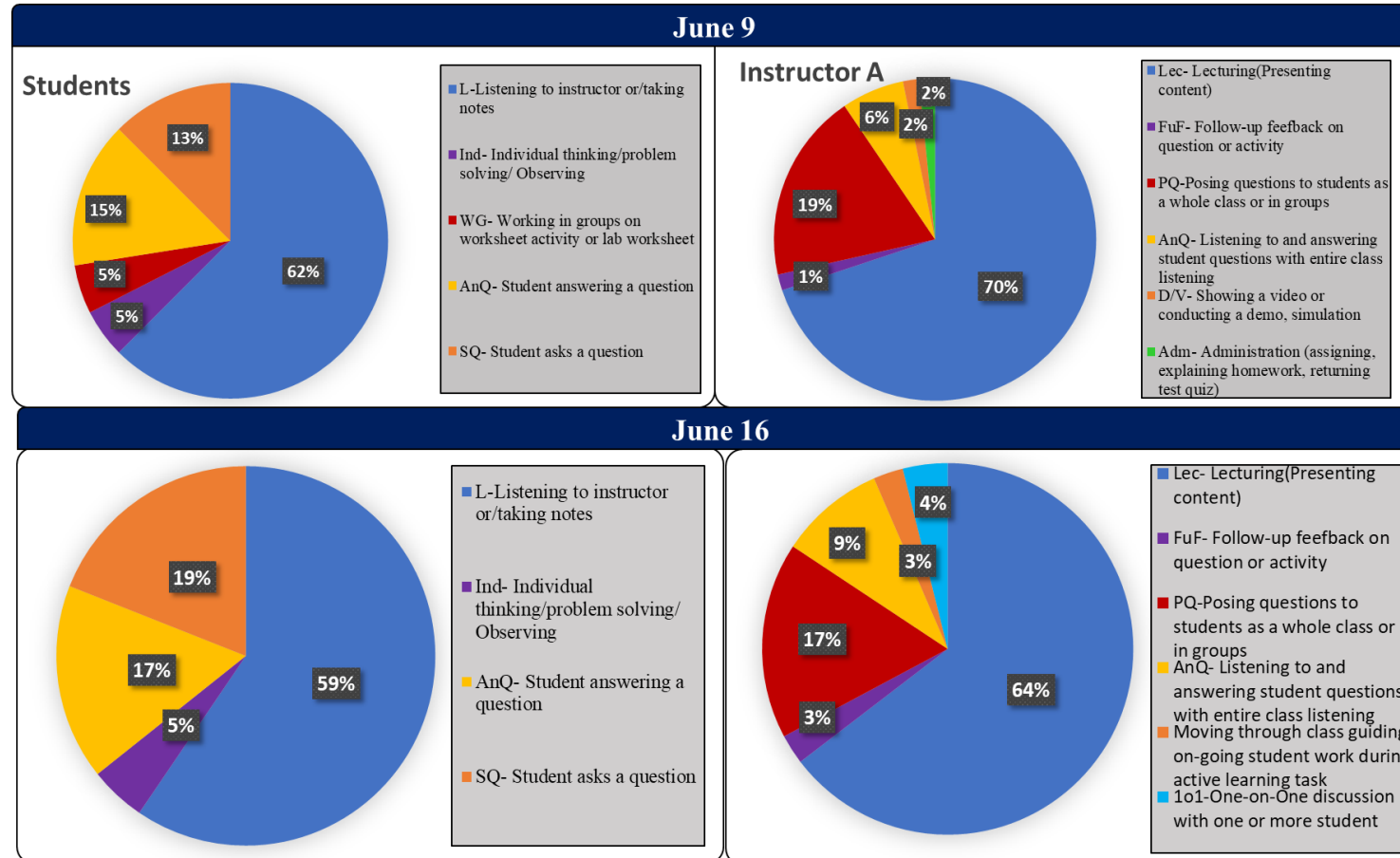
1. What are the Students Doing?

	L	Ind	CG	WG	OG	An Q	SQ	WC	Prd	SP	TQ	W	O	Comments
0-2 min.	✓	✓												
2-4	✓													
4-6	✓													
6-8	✓													
8-10	✓						✓							
10-12	✓						✓							
12-14	✓						✓							
14-16	✓						✓							
16-18	✓					✓								
18-20	✓													
20-22	✓													
22-24	✓													
24-26	✓				✓		✓							
26-28	✓				✓		✓							
28-30	✓													
30-32	✓													
32-34	✓													
34-36	✓	✓				✓	✓							
36-38	✓					✓	✓							
38-40	✓					✓								
40-42	✓													
42-44	✓													
44-46	✓							✓						
46-48	✓							✓						
48-50	✓							✓						
Total=	25	2		2		6	5							Totals= 40
%	62.5	5		5		15	12.5							100

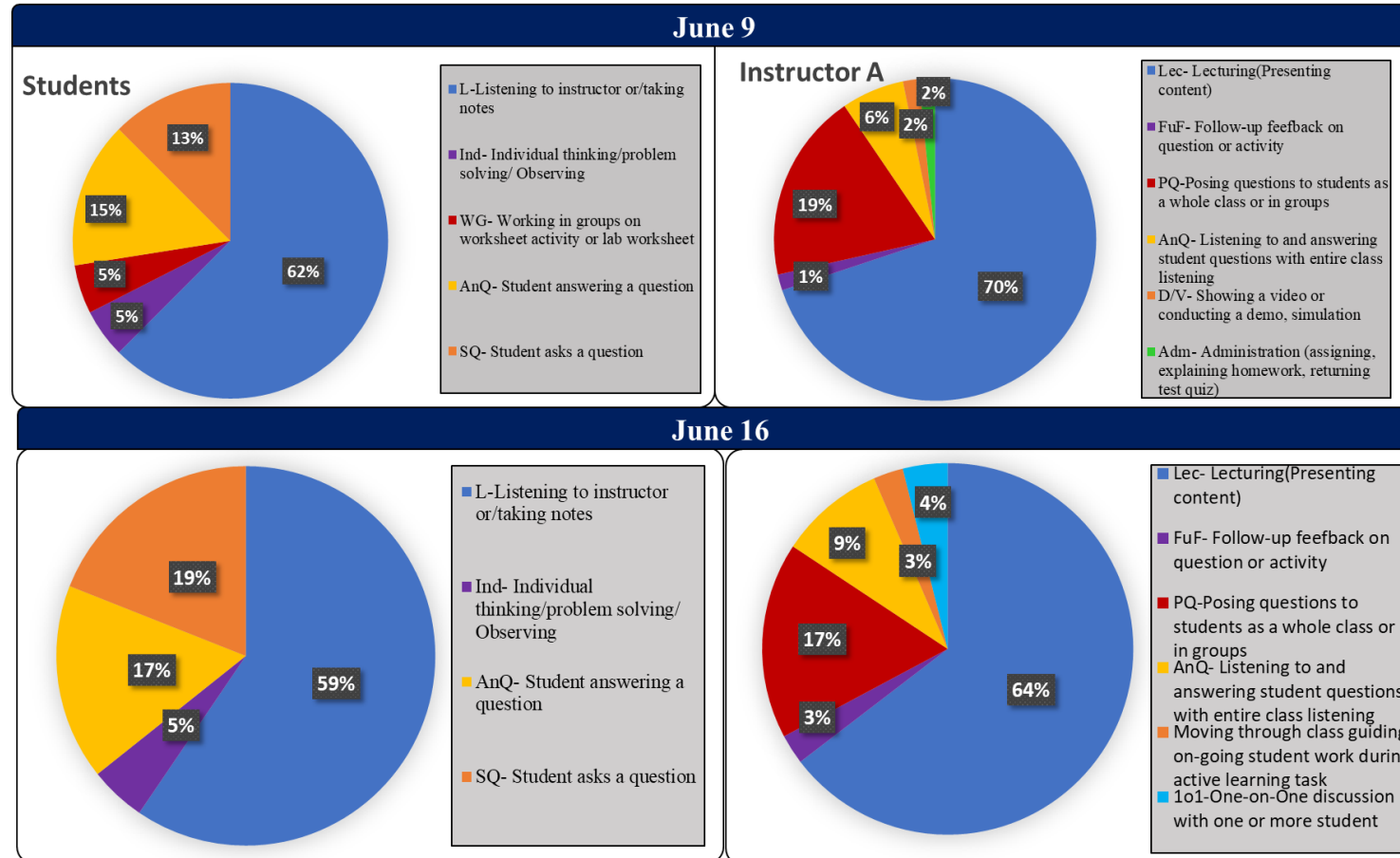
2. What is the Instructor Doing?

	Lec	RW	FuF	PQ	AnQ	MG	1o1	D/V	Ad m	W	O	Comments
0-2 min.	✓			✓					✓			
2-4	✓			✓								
4-6	✓			✓								
6-8	✓											
8-10	✓				✓							
10-12	✓			✓	✓							
12-14	✓											
14-16	✓											
16-18	✓			✓								
18-20	✓											
20-22	✓											
22-24	✓				✓							
24-26	✓			✓	✓							
26-28	✓		✓	✓	✓							
28-30	✓							✓				
30-32	✓											
32-34	✓				✓							
34-36	✓			✓	✓							
36-38	✓				✓							
38-40	✓				✓							
40-42	✓				✓							
42-44	✓				✓							
44-46	✓				✓	✓						
46-48	✓				✓							
48-50	✓				✓							
Total=	24		1	12	4				1.6	1.6		Total= 43
%	69.9		1.6	19	6.3							100

# Sample descriptive result.



# Sample descriptive result.



## TA's Instructional Behaviors Codes in LOPUS

Type of Behavior	TA Code <sup>a</sup>	Abbreviated Definition
Typical instructional behaviors	Lec	Lecturing to the class
	RtW	Real-time writing on the board, doc cam, etc
	FUp	Providing follow-up/feedback on activity
	D/V	Showing a demonstration or video
	M <sup>b</sup>	Monitoring class or individual groups
Interactive behaviors	PQ	Posing a lab-related question (nonrhetorical)
	1o1-Talk <sup>b</sup>	Talking to individual student or group of students one-on-one
	1o1-TPQ <sup>b</sup>	Posing a question to individual students or group of students
	VP <sup>b</sup>	Verbal monitoring and positive reinforcement
	TI <sup>b</sup>	Initiating one-on-one interaction with individual students or group of students
Noninstructive behaviors	Adm	Performing administrative tasks

## Students' Behaviors Captured in LOPUS

Type of Behavior	Student Code <sup>a</sup>	Abbreviated Definition
Typical instructional behaviors	L	Listening to TA, video, or student presentations as a class
	Lab <sup>b</sup>	Performing the lab activity
	TQ	Taking a test or quiz
Interactive behaviors	SQ	Asking the TA a lab-related question with entire class listening
	1o1-SQ <sup>b</sup>	Individual student or a group of students asking the TA a lab-related question
	WC	Engaging in whole class discussion often facilitated by TA
	Prd	Making a prediction about the outcome of demo or experiment
	SP	Giving a presentation
	SI <sup>b</sup>	Initiating one-on-one interaction with the TA
Noninstructive behaviors	SL <sup>b</sup>	Leaving the lab for the day
	W	Waiting

A close-up, grayscale image of a watch face. The watch has a dark dial with light-colored hour markers and hands. The text "Practice time" is overlaid in a white, serif font in the upper left quadrant of the watch face. The watch is set against a dark background.

Practice time



Questions

