



Utilizing COPUS Data to Advance Student Engagement

Students Assessing Teaching And Learning Program – Riley Whitmer and Shaira Vargas
Contact Information: rwhitmer@ucmerced.edu and svargas30@ucmerced.edu



Research Question

What is the experience of instructors utilizing COPUS results to advance student engagement?

Introduction



SATAL Mission: To engage both instructors and students as co-creators of teaching and learning to sustain an inclusive and equitable learning environment at a student-centered HSI & AANAPISI research institution created to serve the communities of the San Joaquin Valley, California and located on land first inhabited by local indigenous people, including the Yokuts and Miwuk.

- Active learning is an evidence-based teaching practice which requires students to engage cognitively and meaningfully with the course materials (Armbruster et al., 2009; Bransford et al., 1999; Chi & Wylie, 2014; Driessen et al., 2020). There are many benefits associated with the implementation of active learning pedagogies (Chickering & Gamson, 1987; Crouch & Mazur, 2001; Freeman et al., 2014; Hake, 1998; Knight & Wood, 2005; Maciejewski, 2016; Ong et al., 2011; Prince, 2004; Ruiz-Primo et al., 2011; Singer & Smith, 2013; Smith et al., 2005; Tomkin et al., 2019)
- Active learning practices are emblematic of high-quality teaching in higher education. However, despite the widespread research, the incorporation of active learning practices remains low (Fraser et al., 2014); (Eddy, Converse, & Wenderoth, 2015). Shifting large numbers of STEM faculty to include even small amounts of active learning strategies in their teaching may effectively educate far more students and raise retention of undergraduate STEM students (Owens et al., 2017).
- Instructors may perceive themselves to be using more active learning pedagogies than they really are in their classrooms (Ebert-May et al., 2011; Van der Lans et al., 2018). In contrast, reliable and validated classroom observation protocols have been developed to objectively support instructors as they implement and reflect on their active learning activities.
- Reflecting on COPUS data can lead instructors to adopt more COPUS codes into their session. To close the assessment cycle, instructors collaborate with SATAL to identify new active learning practices that can advance student engagement.

Methodology

COPUS – Classroom Observation Protocol for Undergraduate STEM

- COPUS simultaneously documents instructor and student practices in 2-minute intervals throughout a class session using 12 individual instructor codes and 13 student codes categorized into four collapsed instructor and student codes adapted from (Smith et al. 2014).
- COPUS is intended to describe the instructor and student behaviors in the classroom.
- COPUS allows STEM faculty to reliably characterize how faculty and students are spending their time in the classroom.

COPUS Codes

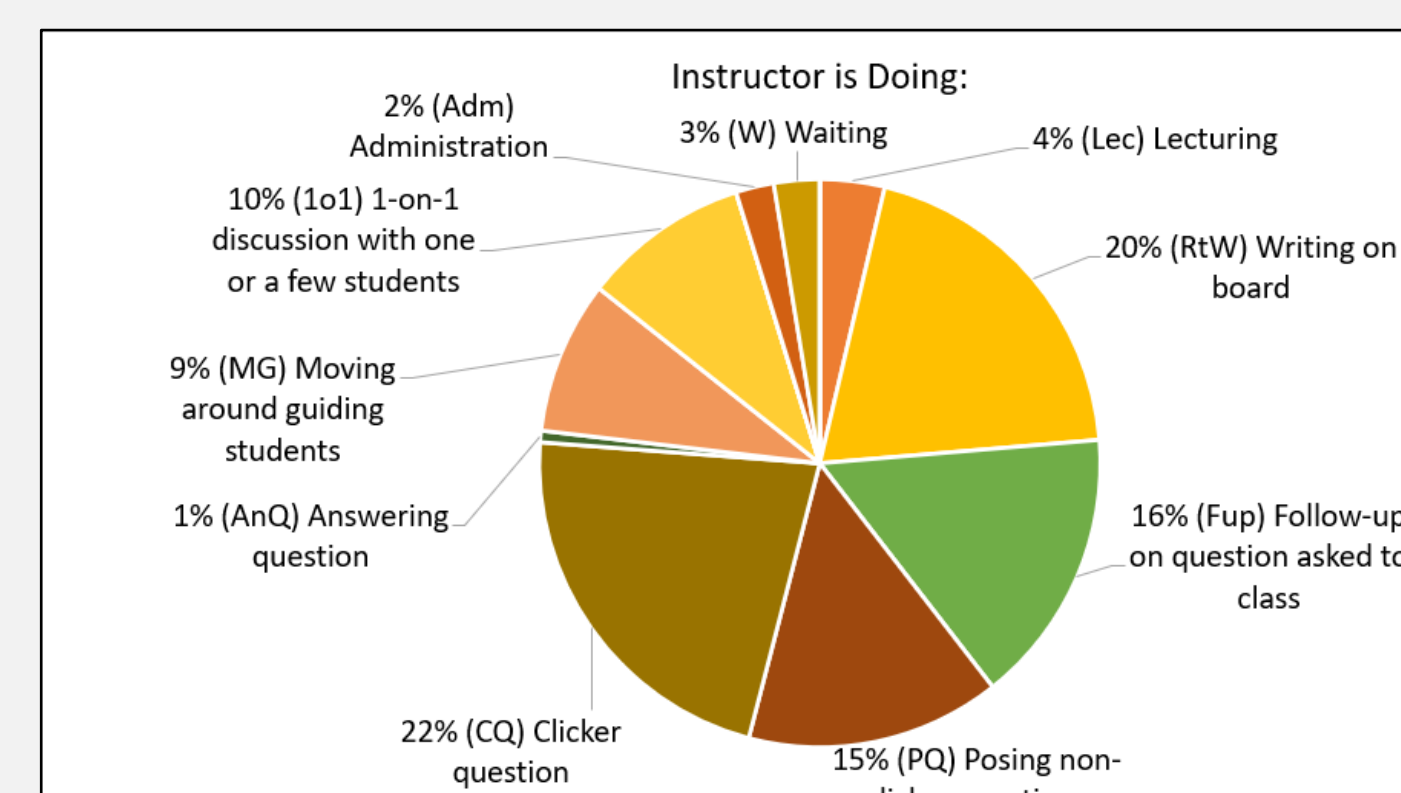
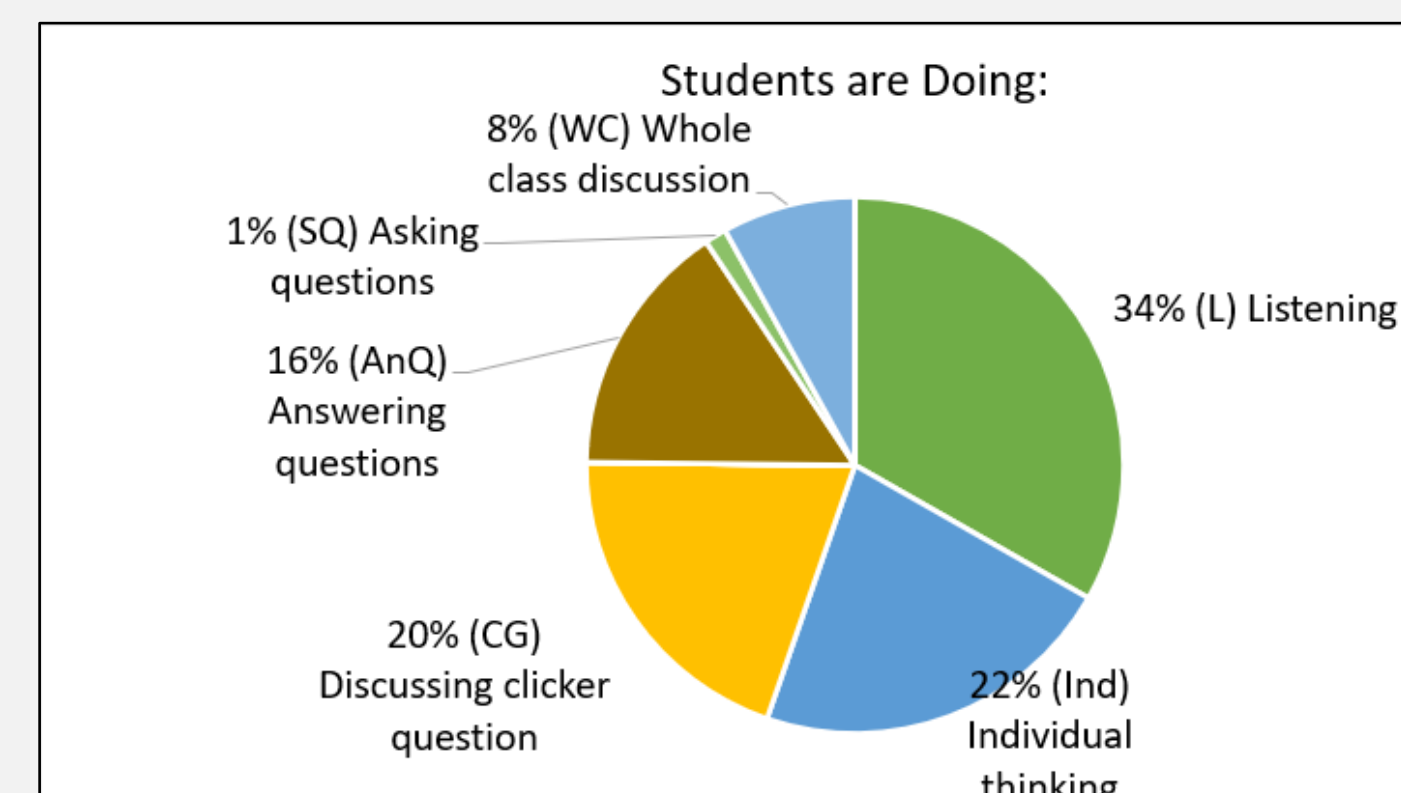
Instructor Collapsed Code	Instructor Code	Student Code	Student Collapsed Code
Presenting	Lecturing (Lec)	Listening (L)	Receiving
	Real-time Writing (RTW)	Listening (L)	
	Demo/Video (D/V)	Listening (L)	
Guiding	Posing Questions (PQ)	Predicting (Prd)	Working & Talking
	Answering Question (AnQ)	Answering Question (AnQ)	
	Follow-up (Fup)	Student Question (SQ)	
	Moving and Guiding (MG)	Answering Question (AnQ), Whole Class Discussion (WC)	
	One-on-One (1o1)	Group Clicker Question (CG), Group Worksheet (WG), Other Group Work (OG)	
Clicker Question (CQ)	Group Clicker Question (CG), Group Worksheet (WG), Other Group Work (OG)		
Administering	Administering (Adm)	Listening (L)	Assessment
	Other (O)	Test or Quiz (TQ)	
Other	Other (O)	Other (O), Waiting (W)	Other
	Waiting (W)	Other (O), Waiting (W)	

COPUS Notes Template

A	B	C	D	E	F	G	H	I	J	K	L	M	N
Time	Engagement	Students doing:					Notes	Instructor doing:					Notes
3:00	M	L	AnQ	WC			Students settle in. Some students mumble answers. Students listen to the instructor to go over what they will learn that day.	Adm	PQ				The instructor welcomes the class. The instructor asks how their first week has been. The instructor tells students they do not need to worry about the problems on the board right now. The instructor tells students what they are going to do for the day. The instructor prompts the first clicker question: Select the best set of reagents to accomplish the following transformation. She gives students some pointers before solving the question. She writes some things for students to think about on the slide. She tells students they will answer this one together. The instructor asks students questions about the problem. She continues to ask students these questions.
3:02	H	L	WC	AnQ			Students listen to the instructor explain the clicker question. Multiple students shout out answers.	CG	RTW	PQ	Fup		The instructor explains the problem. She numbers one of the chairs. She then tells students to discuss with each other. The instructor goes to one student raising their hand.
3:04	H	L	CG	Ind			Students listen to the instructor explain the clicker question. Students then discuss the question with each other and individually.	CG	Fup	RTW	1o1		The instructor remains with that student. The instructor returns to the front of the classroom. She checks in with a group on the far right. She checks in with another group on the middle left. She checks in with a student in the middle left row.
3:06	H	CG	Ind				Students continue to discuss the question with each other and individually.	1o1	MG	CQ			

Results

COPUS Data

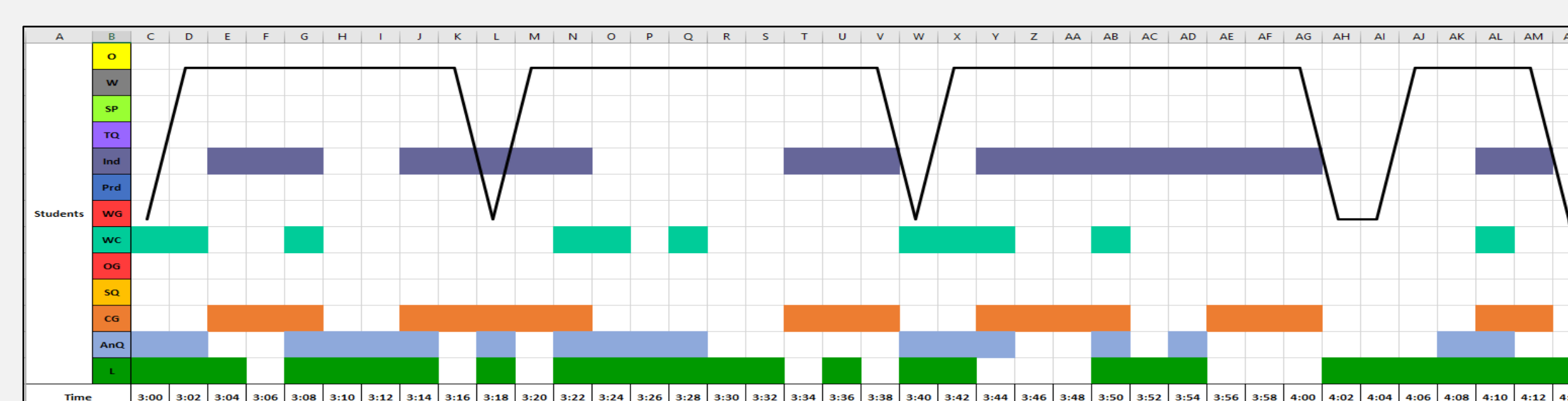


Student Code	% of Time	Minutes
L	34%	25
Ind	22%	17
CG	20%	15
WG	0%	0
OG	0%	0
AnQ	16%	12
SQ	1%	1
WC	8%	6
Prd	0%	0
SP	0%	0
TQ	0%	0
W	0%	0
O	0%	0

Instructor Code	% of Time	Minutes
Lec	4%	3
RTW	20%	15
Fup	16%	12
PQ	15%	11
CQ	22%	17
AnQ	1%	<1
MG	9%	7
1o1	10%	7
D/V	0%	0
Adm	2%	2
W	3%	2
O	0%	0

Instructor Guidelines

Student Code	If...	then...	Student Code
Listening (L)	the percentage of Listening (L) is higher than desired	try to Following-Up (Fup) on a Student Presentation (SP).	Listening (L) in addition to: <ul style="list-style-type: none"> Student Presentation (SP) Whole Class Discussion (WC) Answering Question (AnQ) Student Question (SQ)
Lecturing (Lec)	your percentage of Lecturing (Lec) is higher than desired	try Posing a Question (PQ) with a think-pair-share activity. try adding a Clicker Question (CQ) and implementing a Follow-up (Fup)	Individual Thinking (Ind) Other Group Work (OG) Whole Class Discussion (WC) Answering Question (AnQ) Student Question (SQ)



The bar chart on the left represents student engagement throughout the class session. The black line of student engagement remains high except for times when students are invited to answer questions.

SATAL Resources



SATAL Sample Notes for Instructors

- Based on these data, what do you think you are doing that is working well to help students learn best?
 - The students are spending 15% of the class Answering Questions (AnQ) posed by the instructor, participating in Whole Class Discussions (10%), and participating in Other Group Activities 19% of the time. This shows that students are engaging with the material sufficiently.
 - We identified that students only Asked Questions (SQ) 1% of the time. This is probably because they spent a lot of time Answering Questions (AnQ) at a fast pace, so they may need more time to formulate questions of their own.
 - We identified that 27% of the class time is spent Taking Quizzes (TQ), but I think it is beneficial.
- What questions do you have after seeing these data?
 - Individual thinking (7%) and Student Questions (1%) are very low, could incorporating more Individual Thinking (Ind) increase the amount of Student Questions (SQ)?

Closing the Assessment Cycle

Changes instructors made to their teaching practices	<ol style="list-style-type: none"> Add pauses after questions to allow for questions Introduce group worksheets Diversify active learning activities during class sessions Add group clicker questions
Impact based on instructors' changes	<ol style="list-style-type: none"> Added more opportunities to ask & pose questions Added more time to walk around for individual or group interaction, encouraged students to come to class & gave them in depth understanding on high topics Engaged students of different learning preferences Allowed for student-student interaction and know when students finished the conversation

Feedback Received from Faculty Partners

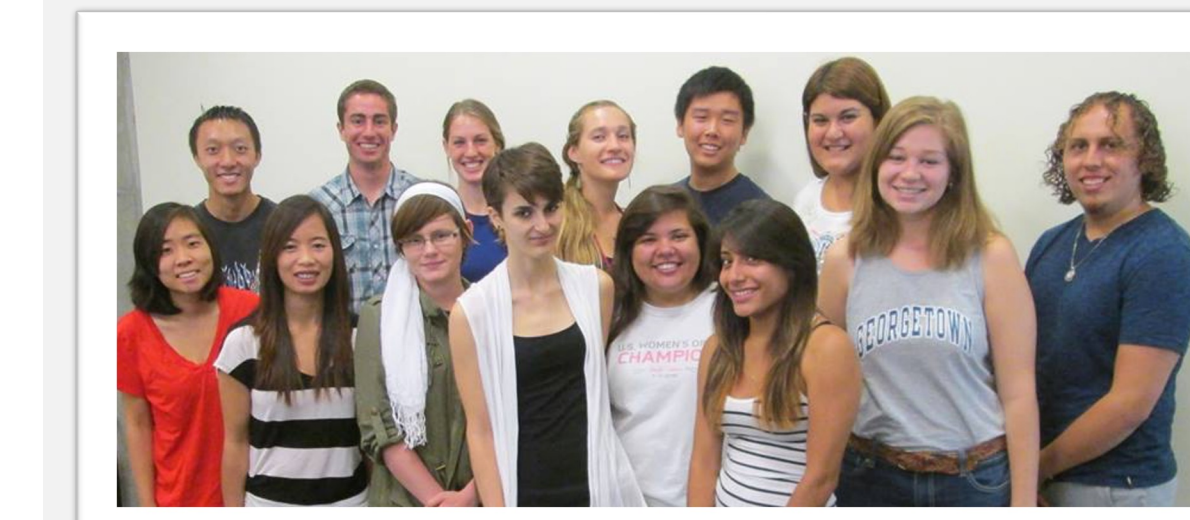
"It was a pleasure working with the SATAL team. I highly appreciate our discussions and your guidance throughout the class evaluation process. SATAL students' work was very professional – they communicated well, kept their work confidential and presented me with the results summary in a timely manner" – Chemistry lecturer

"I would like to think that I gradually improve my classroom teaching each time I meet with SATAL and discuss their recent visits to my classroom. They give me examples of 'the good and the needs-improvement' and I try to implement their suggestions in the following year."

Acknowledgments

SATAL Students who are assisting faculty and programs in their existing assessment projects: Riley Whitmer, Shaira Vargas, Christian Urbina, Avreen Bal, Tea Pusey, Ayo Babalola, and Bella Woodruff

The SATAL program is sponsored by the Division of Undergraduate Education



References

