

Is Your Teaching Learner-Centered? The Investigation of Practices and Beliefs at a Minority-Serving Institution

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Background

• UC Merced is a Minority-Serving Institution demonstrating importance and resource for strengthening STEM fields. A briefing for UC Merced undergraduate population during 2019~2020:

- o 74% first-generation.
- o 54% Hispanic.
- 64% Pell-Grant eligible.
- Due to COVID-19 pandemic, UC Merced went through two years of remote instructions. During this period, various pedagogical changes were made by instructors to adapt the online environment and studied in previous works¹.

			• RQ1:		
Observa	tions	Interviews	LCT Framework	Balance of power	Fu
		O_{12} 17 is started as	O-COPUS result	0.0%	
On 6 Instructors during online		On 17 Instructors during the same Fall	CDOP result	5.9%	
2020 semester.		2020 semester.		Table	. O-(
			• RQ2:		
			Interview co	odes	Balance power
O-COPUS:	CDOP:		•••		
12 code	17 codes with	Semi-structured setup,	Being more selective	with content	
descriptions for	associated code	2 questions focused	Trying new technolog	gy tools	

Results

• KQT:					
LCT Framework	Balance of power	Function or content	f Role of the teacher	Responsibility of learning	Purpose and processes of evaluation
O-COPUS result	0.0%	33.3%	50.0%	16.7%	41.7%
CDOP result	5.9%	23.5%	52.9%	35.3%	17.6%
	Table 4	4. O-COPUS ar	nd CDOP data into	o construct	
• RQ2:					
Intorviou co	Ba	alance of Fu	Inction of Role of	f the Responsibility	Purpose and

for learning

evaluation

teacher

- Learner-Centered Teaching (LCT)² pedagogies provide students with multiple benefits and share more importance during remote instruction periods. It includes 5 keys:
 - Balance of power: power and decision making is shared by faculty and students.
 - Function of content: course content plays a dual function in the curricula: establishing a knowledge base and promoting learning.
 - Role of the teacher: faculty guide and facilitate learning by stepping aside from the center of the classroom and shifting the from themselves to the students.
 - Responsibility of learning: faculty create learning environments with fewer rules and requirements which are more conductive to student learning.
 - Purpose and processes of evaluation: faculty deploy a variety of assessment opportunities to enhance students' potential to promote learning and give them chances to develop selfand peer-assessment skills.

• Classroom Observation Protocols for Undergraduate STEM (COPUS)³ and its online variant, O-COPUS⁴, can help educators measure college STEM teaching practices and become powerful tool to examine Evidence Based Teaching Practices, including the active learning strategies, at different levels. instructor behaviors based on the dynamics occurring online.

Recorded at 2-min time interval.

O-COPUS Code Descriptio COPUS Code Lecturing (presenting content, deriving ecturing mathematical results, present a (Lec) roblem solution. etc.) Realtime writing on board, doc. piector, etc. (often checked off with Writing (RtW) howing or conducting a demo periment, simulation, video, or low-up/feedback on clicker question activity to entire class Moving through breakout rooms guiding ongoing student work durin active learning task **or guidin**g Moving and active learning task by providing the microphone or messaging One on one extended discussion wit sing non-clicker question to studen Posing a messaging function and waiting fo (PQ) students to respond.

descriptions on this work.⁶ characterizing teacher-initiated discourse moves.

Recorded at 2-min time interval.

CDOP Code

Sharing

Real-worlding

Linking

Forecasting

Evaluating

Generative

Checking-in

Clarifying

Connecting

associate past topic to curr

erval.			
CDOP Code description			
eacher shares information, nswers student question, or rovides instructions for nding the solution.			
eacher relates idea to onventional knowledge, roader perspective, and structor's or student's	Or	en cvcle co	dina
ersonal experiences. eacher associates past topic o current topic.	ID	Dialogue	CD initial
eacher associates current ppic to future topic. eacher repeats, accepts	Interviewer	Compared to in-person instruction, how did your teachir	ng
nd/or rejects student's esponse, or acknowledges nat they don't know the nswer to a student's uestion.	136	Alas, I have literally taken some assignments and only assigned about 80 percent, maybe 75 percent of what I have assigned just last year.	Change: Decreased workload for students
eacher asks student to recall cts, and basic concepts, or elated information.	Та	able 3. An example	e of
eacher asks student if they ave a question or need arification.			C
eacher asks student to aborate on condensed, yptic, or inexplicit atement.			

Grades based on presentations 1

Table 5. Part of the results for RQ2

 Some examples of the qualitative analyses based on the results above:

• A representative instructor quote, for *function of content*:

"Well, I did make some YouTube videos of things like autoclaving which I think is a good idea and something that I can reuse. Because they don't necessarily need to see that. So picking and choosing what you actually need to show them."

Such quote is coded as *be more selective with content*, which demonstrates how this particular instructor took some material and made it optional for student who might be interested.

• A representative instructor quote, for *role of the teacher*:

"...so I tried lots of new things and tried to make the activities as much as I could things that they could do in breakout rooms or go to Google Docs or Jamboards and work together. And this seemed to work okay for about the first month or so, and then there was a time probably near the end of September into October when students—they kept coming to class. They would log on, but they just stopped interacting. They stopped unmuting themselves and actually speaking."

Such quote is coded as *trying new technology tools*. This quote and code were particularly interesting because the work described by the instructors wasn't successful, but it's clear that the goal of the change was to find ways to help students be more active in the remote setting.

• Classroom Discourse Observation Protocol (CDOP)⁵ is a new protocol for measuring teacher discourse moves or the general conversational strategies used by the instructor to improve student understanding of content knowledge.



Answering questions (AnQ)	questions using the microphone or messaging function with the entire class listening.		Contextualizing	topic. Teacher asks students to relate idea to conventional knowledge broader		
Clicker question (CQ)	Asking a clicker question or online poll (mark the entire time the instructor is using a clicker question, not just when first asked).	interactive	Representing	perspective, and their personal experiences. Teacher asks student to create a visual or mathematical		
Administrati on (Adm)	Assigning homework, returning tests, class announcements/agenda, assign to breakout rooms, etc.), when the instructor is waiting for students to answer a non-clicker question (i.e., think-pair-share), or administering a test or quiz.	Dialogic, i	Constructing Requesting	representation of content. Teacher asks students to build knowledge by interpreting and/or making judgments based on evidence, data, and/or model. Teacher asks student to justify or explain their reasoning		
Waiting (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.		Explaining Challenging	Teacher asks student to explain reasoning to other students. Teacher asks student to evaluate another student's		•]] •
Other (O)	Other.		No content	idea. Teacher is not talking or asking	Consensus b	uilding
Table 1. texts are	O-COPUS codes. Bold the modifications	Other	discourse Other	students to talk about content TDM not described by these codes.	4 authors inv	volved,
based o	n COPUS		Table 2. C	DOP codes	discussion b	ased.
	Da	ta			Da	ata
		otion				otion
	valida	ατιοπ			valid	ation

• A representative instructor quote, for *purpose and processes* of evaluation, and simultaneously, *balance of power*:

"So I'm trying to train—teach them a little bit about being a college student as well maneuvering through the material. So I've changed kind of the types of materials that I have. I've gotten away from—I'm not having any finals. And I've done a lot of quizzes, but I've also done—I'm doing more projects, and I'm thinking of next semester cutting my quizzes even further and adding more writing, research, project types of things to demonstrate learning, not so much rote quizzes and things like that. So yeah, I'm adapting a lot."

Such quote is coded as *broader set of assessment methods* and such pedagogy increases the variety of evaluations to students learning outcomes. Meanwhile, it also demonstrates a useful way for instructors to share power with student by providing more flexible ways for students to demonstrate knowledge, so it properly fall into both constructs.

Discussion

 O-COPUS codes do not align with LCT framework.
CDOP codes are relatively aligned with LCT framework. They are developed with the authoritative dialogic in mind.
The success or failure to execute the pedagogical changes are not really impeding their contributions to improving LCT, as many failed executions still clearly demonstrate the instructors were finding ways to help students be more active and engaged.
The majority of the interviewed instructors put much more efforts on the activities and resource utilizations out of the classes, instead of in-class. A potential adjustment can be done by incorporating more synchronous activity in class so equal attentions will be put on both.



Learner-centered teaching Figure 1. A schematic for implementing and examining the learner-centered teaching practice in remote instructions.

Research Questions

- **1. To what extent** are faculty's teaching and discourse practices **characteristic** of learner-centered teaching?
- **2. To what extent** do faculty **describe** their teaching practices as learner-centered teaching?

Data into construct: Learner-Cer	ntered Teaching framework
Quantitative	Qualitative
analysis	analysis
Answer to	Answer to
RQ1	RQ2

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