

Comprehensive Instructional Profile Report

Engineering and Computing Education Core

April 14, 2022

Name

How to Make the Most of this Report

The purpose of this report is to provide College of Engineering instructors with descriptive, formative feedback about their teaching that they can use as a basis for reflection and to plan subsequent improvements of their teaching. UNL's three recommended inputs for informing teaching excellence are peer review, student survey, and self-reflection. This report provides a place for you to bring all three inputs together. The report includes the results of peer review in the form of peer observation, and it contains spaces for reflection on the results of those observations as well as the results of the Student Learning Experiences (SLE) survey.

This data used to create this report were collected through the Classroom Observation Protocol for Undergraduate STEM (COPUS) and the Teaching Practices Inventory (TPI) during the S22 semester. The report is divided into the following sections:

1. **Comprehensive Instructional Profile Reflection:** A reflection, to be completed after reviewing the report's contents.
2. **About COPUS:** A brief explanation of COPUS and the data it generates
3. **Your COPUS Results:** Your results from the COPUS observations that were done in your course this semester
4. **Your TPI Results:** Your results from the Teaching Practices Inventory this semester
5. **Recommendations:** Recommendations for you based on your COPUS and TPI results
6. **Resources:** Information about how the Engineering and Computing Education Core (ECEC) can help you implement the recommendations in this report
7. **End of Semester Reflections:** A set of reflection activities designed to be used in conjunction with your Student Learning Experiences (SLE) Survey results
8. **Appendix:** More information about COPUS

Throughout the report, comparisons are made between your data and the data the ECEC has collected on other instructors' courses in the College of Engineering. This dataset contains only instructors who have participated in ECEC programs during or after the Fall 2017 semester and does not contain all teaching faculty in the college.

You can maximize the impact of this report by using it as a basis for reflecting on your teaching practices, which is why we have built reflection exercises into the report itself. We have included the SLE survey results reflection at the end of the report to encourage you to reflect on those data, and so that the record of your reflections can easily be stored together in a single file that can be accessed later or shared (e.g., for annual review purposes). Additional reflection packets are available at <https://engineering.unl.edu/ecec/resources-faculty/>. If you have any questions about this report or how to interpret its contents, contact [Dr. Markeya Peteranetz](#) or [Dr. Tareq Daher](#).

1. Comprehensive Instructional Profile Reflection

Question	Thoughts
COPUS	
Which cluster(s) were you in? Did this surprise you?	
Do these clusters represent what you'd like your teaching to be? If no, what types of teaching activities do you want to do more of? Less of?	
What specific strategies can you try out next time you teach this course to incorporate more active learning, or to incorporate it more consistently?	
TPI	
How did your responses compare to the college average?	
Which category/categories was/were your strongest? Weakest?	
Which of the recommended practices are you doing?	
Which of the recommended practices are you not doing?	
Which of the recommended practices that you are not doing do you plan to incorporate next time you teach this class?	

2. About COPUS

The Classroom Observation Protocol for Undergraduate STEM (COPUS) is a standardized teaching observation procedure that generates a record of instructor and student behaviors during a class session. In contrast with traditional, unstructured observations where the observer takes notes and shares thoughts on whatever they personally feel is worth discussing, COPUS yields descriptive data on how time in class is used. This more objective approach to observation empowers the instructor to self-evaluate and judge the extent to which their teaching philosophy and goals are reflected in the way they use class time. The standardized and more objective nature of COPUS reduces the risk of differences between the instructor's and observer's teaching philosophies leading to a skewed observation record.

Codes

During an observation, all instructor and student behaviors are assigned codes, of which there are 25 codes. Because of the complexity of teaching and learning, a single event in a classroom is likely to receive multiple codes. The 25 codes can be collapsed into 8 categories (4 for students and 4 for faculty).

For students:

- “Receiving” indicates listening and/or taking notes.
- “Working” indicates individual thinking or problem solving, working in groups, making predictions about a demonstration or experiment, or taking a test or quiz.
- “Talking” indicates answering a question alone or in groups, asking a question, engaging in whole-class discussion, or giving a presentation.
- “Other” covers any time students spend waiting (interruptions, technical problems, etc.) as well as any other behaviors that do not fit into the resting of the coding scheme.

For faculty:

- “Presenting” indicates lecturing (with slides, while writing on the board, or neither), conducting a demonstration or experiment, or showing a video.
- “Guiding” indicates following up with the whole class on a question or activity, asking a question, answering a student question, moving around the class while students work, or working one-on-one with one or a few students.
- “Administrative” indicates any administrative tasks like taking attendance, returning homework, etc.
- “Other” indicates waiting without interacting with or intentionally observing students as well as any other behaviors that do not fit into the resting of the coding scheme.

Profiles

COPUS data can be used to identify the “type” of teaching and learning that took place during a class. Using thousands of observation records from STEM classes, Marilyn Stains and her colleagues identified seven different clusters that they grouped into three categories (see Appendix for more information about each cluster).

1. **Didactic Instruction:** This mode of instruction contains around 80% lecture with minimal student involvement. There may be sporadic questions to and from students, and students may occasionally be asked to work as a group to answer instructor questions.
2. **Interactive Lecture:** This mode of instruction supplements lectures with student-centered strategies. There are questions to and from students, and students work together to answer questions, solve practice problems, or work on other activities.
3. **Student Centered:** This mode of instruction relies less heavily on lecture, but lecture might still be a prominent part of the class. Lecture is supplemented with student-centered strategies such as group work, questions to and from students, and one-on-one support from the instructor.

The ECEC has set a college goal to have at least two-thirds of course sessions be classified as Interactive Lecture or Student Centered.

More details about COPUS and the profiles are given in the Appendix.

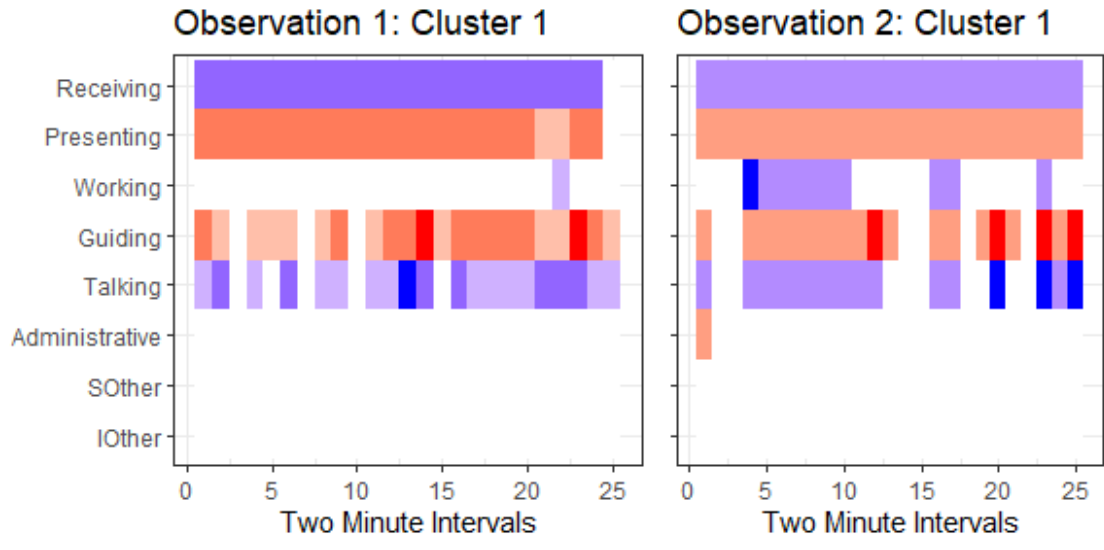
3. Your COPUS Results

This Comprehensive Instructional Profile is based on your instruction in ENGR XXX. COPUS observations were conducted on 1/1/2022 and 1/2/2022. The data analysis resulted in the following:

Instructional Profiles

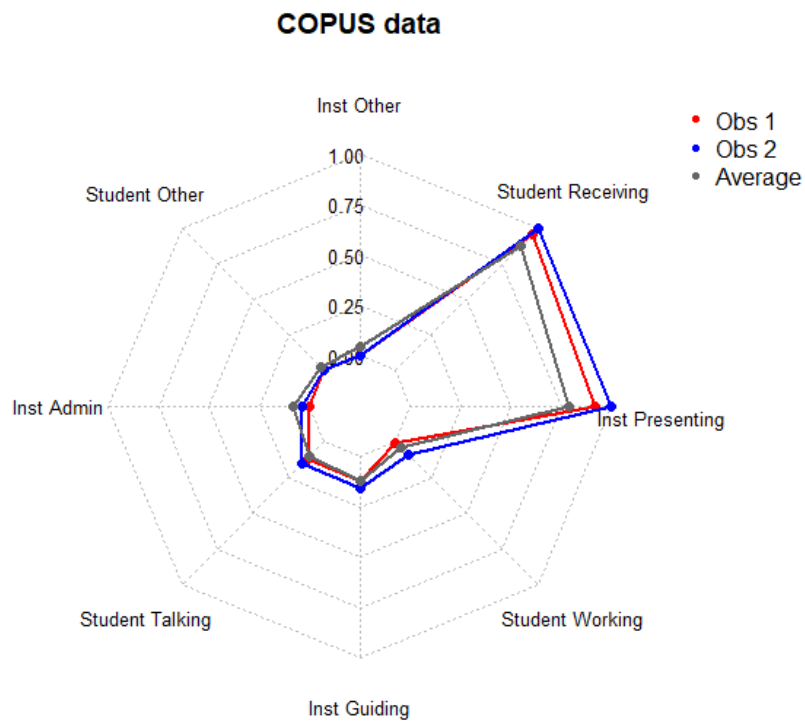
Your cluster for Observation 1 was 1. Your cluster for Observation 2 was 1.

The graphs below show the various student and instructor activities that were recorded for each of your observations. Student activities are shown in blue/purple, and instructor activities are shown in red/orange. Darker shading indicates more activities from that category (see groupings in the “Codes” section above) were coded by your observer(s) during the 2-minute period. Category components are given with the explanation of COPUS above.



COPUS Categories

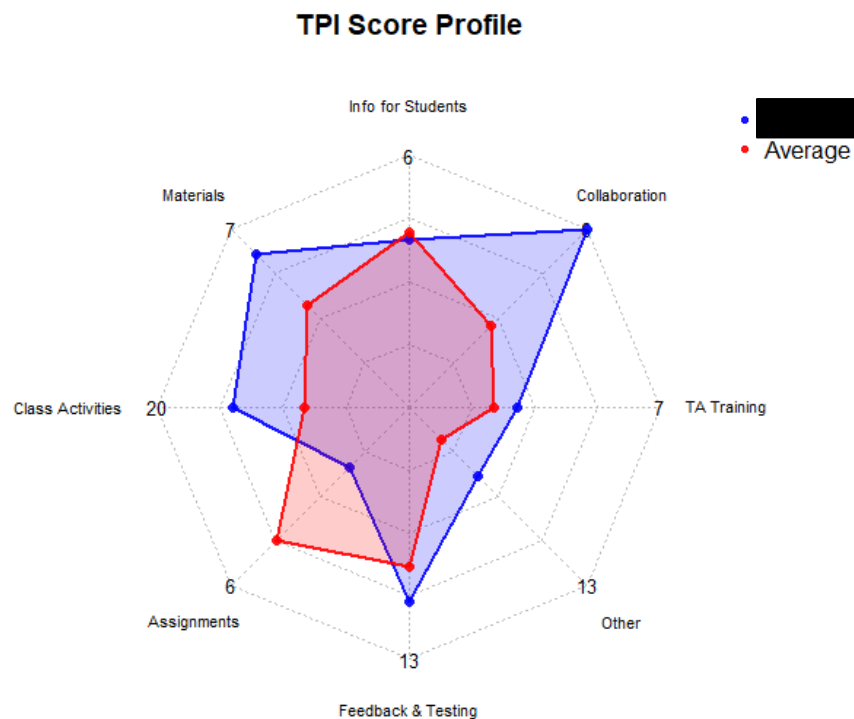
The next chart shows how your COPUS results compare to the results from all other instructors in the College of Engineering who have been observed with COPUS in one of the ECEC's programs.



4. Your TPI Results

The Teaching Practices Inventory is a tool intended to facilitate instructors' reflection on their teaching. It has been tested with several hundred university instructors in STEM fields. You can view [all questions in the TPI here](#). Keep in mind that no single course is expected to incorporate all of the things listed in the TPI and there is no single formula for high-quality instruction. Additionally, the TPI does not include all evidenced-based teaching practices, especially practices that are discipline specific. We encourage you to use these results as a starting point for thinking about the ways in which you are providing strong support for your students as well as the ways in which you could expand your current practices.

This chart shows a high-level comparison of how your responses to the TPI compare to those of other faculty in the college. The scoring of the TPI gives more weight to practices that are shown by research to be more beneficial to student learning. The perimeter of the chart represents the maximum possible value for each category.



Summary of TPI Results

- For Information for Students, you scored 4 out of 6. Your practices in this area are likely benefitting students, but there are likely ways to expand what you are already doing.

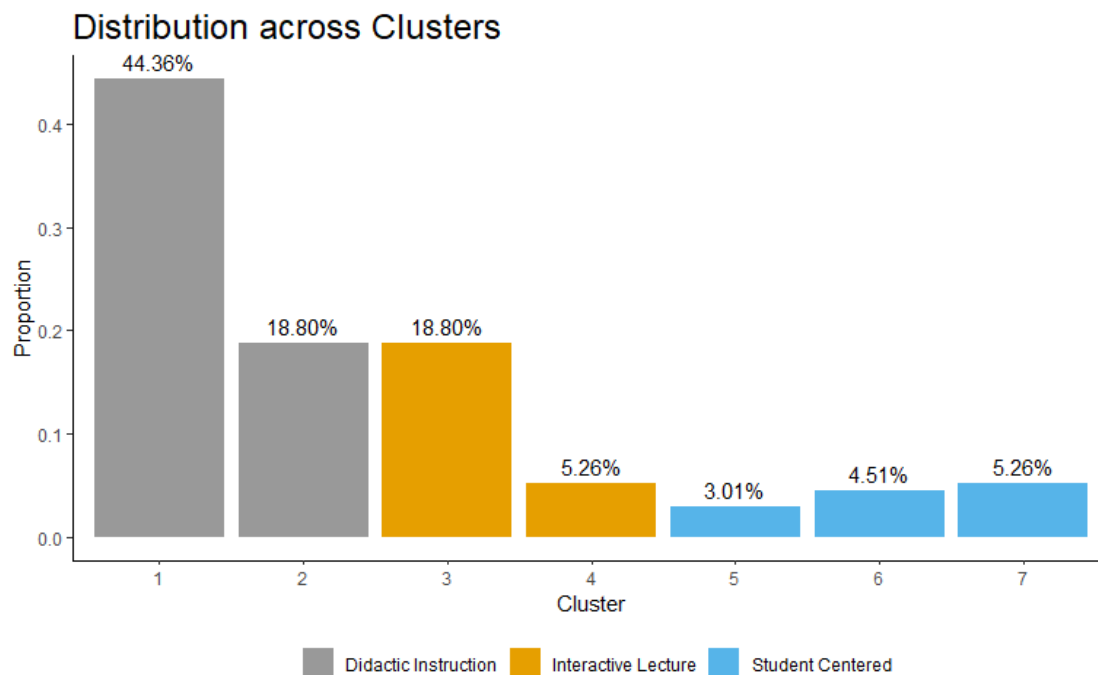
- For Supporting Materials, you scored 6 out of 7. This is an area of strength for your teaching.
- For In-Class Activities, you scored 14 out of 20. This is an area of strength for your teaching.
- For Assignments, you scored 2 out of 6. This area presents an opportunity for improvement.
- For Feedback and Testing, you scored 10 out of 13. This is an area of strength for your teaching.
- For Other, you scored 5 out of 10. Your practices in this area are likely benefitting students, but there are likely ways to expand what you are already doing.
- For TA Training and Guidance, you scored 3 out of 7. Your practices in this area are likely benefitting students, but there are likely ways to expand what you are already doing.
- For Teaching Collaboration, you scored 6 out of 6. This is an area of strength for your teaching.

5. Recommendations

COPUS

This chart shows the number of College of Engineering faculty whose observed course sessions were classified into each of the seven clusters. **Our goal is to have at least two-thirds of course sessions be classified as Interactive Lecture or Student Centered.** Your observed course sessions were classified as 1 and 1.

Based on these classifications, we recommend you consider incorporating more student interaction and activity into your courses. Student interaction and activity could include brief discussions among pairs or groups of students, more regular opportunities for students to ask and answer questions, or individual and group practice activities.



TPI

All of the practices highlighted in this section are evidence-based practices we strongly encourage instructors to use. What follows is a comparison between what you reported and what other instructors in the College of Engineering have reported.

Information for Students

You indicated that you **do** provide students a list of topic-specific competencies students should achieve in the course. About **78.79%** of instructors in the college who have taken the TPI reported providing a list of topic-specific competencies.

Supporting Materials

You indicated that you **do** provide students with solutions to homework assignments. About **78.79%** of instructors in the college who have taken the TPI reported providing solutions to homework assignments.

You indicated that you **do** provide students with worked examples of sample problems. About **78.79%** of instructors in the college who have taken the TPI reported providing worked examples.

In-Class Activities

You indicated that you pause to ask students questions about **7-10 times** per class. On average, instructors in the college who have taken the TPI reported pausing to ask students questions about **4-6 times** per class.

You indicated that you have students discuss or solve problems in groups an average of **2-3 times** per class. On average, instructors in the college who have taken the TPI reported having students discuss or solve problems in groups **1 time** per class.

You indicated that you **do** have students complete assignments or quizzes near or at the start of class over material they were to view before class. About **57.58%** of instructors in the college who have taken the TPI reported using this practice.

You indicated that on average you lecture **40-60%** of the class period. Instructors in the college who have taken the TPI reported lecturing **40-60%** of class periods.

You indicated that you pose a question to students and then have them engage in discussion **2-3 times** per class. On average, instructors in the college who have taken the TPI reported having students engage in discussion following a question **1 time** per class.

Assignments

You indicated that you **do not** assign graded homework at least every 2 weeks. About **90.91%** of instructors in the college who have taken the TPI reported assigning graded homework at least every 2 weeks.

Feedback and Testing

You indicated that you **do** let students see graded assignments and you **do** let students see graded quizzes/exams. Of the instructors in the college who have taken the TPI, **96.97%** reported letting students see graded assignments and **84.85%** reported letting them see graded quizzes/exams.

You indicated that you **do** let students see the answer keys for graded assignments and you **do** let students see the answer keys for graded quizzes/exams. Of the instructors in the college who have taken the TPI, **87.88%** reported letting students see the answer keys for graded assignments and **48.48%** reported letting them see the answer keys for graded quizzes/exams.

Other

You indicated you **do not** use a consistent measure of learning that can be used to compare learning across sections and semesters. About **12.12%** of instructors in the college who have taken the TPI reported using a measure to comparing learning across sections and semesters.

You indicated that you **do** provide opportunities for students to self-evaluate their learning. About **39.39%** of instructors in the college who have taken the TPI reported providing opportunities for self-evaluation.

TA Training and Guidance

You indicated you **do** have TAs for this course. You also indicated you do meet with TAs at least once every 2 weeks. Of the instructors in the college who have taken the TPI and reported having a TA, about 50% of them had Instructor-TA meetings at least once every 2 weeks.

Peer Collaboration for Teaching

You indicated you **frequently** discuss how to teach this course with your colleagues. On average, other instructors in the college who have taken the TPI reported they **occasionally** discuss teaching their courses with colleagues.

You indicated you **occasionally** observe a colleague's class to get or share ideas for teaching. On average, other instructors in the college who have taken the TPI reported they **rarely** observe colleagues' classes to get or share ideas for teaching.

6. Resources

Contact the ECEC:

Email us at enr-ecec@unl.edu or visit [the ECEC website](#)

Our Instructional Designers can help you:

- incorporate more evidence-based strategies into your courses
- design, develop, implement, and evaluate new learning activities and innovative pedagogies
- integrate instructional technology into your teaching to enhancing learning

Our Learning Assessment Coordinator can:

- review your classroom assessment processes and provide recommendations
- teach you how to evaluate the quality of your classroom assessments
- help you develop new classroom assessments

Our ongoing faculty programs include:

- Faculty Teaching Fellows Program - engage in a variety of activities over multiple years that will help you improve your teaching and build relationships with other faculty focused on teaching excellence
- Learning by Design - learn the Backwards Design process as you develop or redevelop a course
- Peer Observation of Classroom Activities (POCA) - get feedback on your teaching and learn about how other instructors in the college approach teaching

7. Reflection

Teaching Reflection is one of UNL's three recommended inputs for informing teaching excellence, along with Peer Review and Student Survey. The following two reflection exercises are available in a separate document on [this page on the ECEC website](#). The CC & ASC committee voted to recommend this packet be used within the College of Engineering on October 27, 2020.

The first reflection is intended to be completed near the end of the semester and prior to reviewing your Student Learning Experiences (SLE) survey results. The second reflection is intended to be completed within a week of reviewing your SLE survey results and before the start of the next semester.

End of Semester Reflection

Course: ENRG XXX

Date of Reflection _____

Question	Thoughts
What went especially well this semester?	
What was my favorite part of teaching this course this semester?	
What was the most challenging part of teaching this course this semester?	
Did all my students meet all the learning objectives for the course? If not, what can I do to ensure they do next time?	
What changes do I need to make to lessons, activities, and/or materials before the next time I teach this course?	
Do I need to seek out help or information to make those changes? If yes, what do I need and where can I get it?	
How did my teaching in this course reflect my personal beliefs about high-quality teaching?	

Student Learning Experiences Survey Data Reflection

Course: ENGR XXX

Date of Reflection _____

Question	Thoughts
<p>To what extent did your End of Semester Reflection (previous reflection activity) align with the results of the SLE survey? Did your students experience seem to match what you expected?</p>	
<p>What from your SLE survey results surprised you?</p>	
<p>Of questions 1-10 (agree/disagree items), which items signal a need for improvements? What steps can you take to improve in these areas?</p>	
<p>Which two teaching elements did students identify most as being beneficial to their learning? What can you do to maximize those elements in the future?</p>	
<p>What two teaching elements did students identify most as needing improvement? What can you do to make improvements in these areas?</p>	
<p>What changes are you considering for the next time you teach this class?</p>	

8. Appendix

About COPUS

Smith et al. (2013) developed a teaching observation procedure known as the Classroom Observation Protocol for Undergraduate STEM (COPUS). This protocol allows STEM faculty, after a short 1.5-hour training period, to reliably characterize how faculty and students are spending their time in the classroom.

Observers attend a course for 50 minutes and used a COPUS form to mark instructor and student behaviors in 2-minute intervals using a spreadsheet like the one pictured below.

Date: _____ Class: _____ Instructor: _____ No. students: _____ Observer Name: _____

Classroom arranged how? _____

1. L-Listening, Ind-Individual work, CG-Clicker Q discuss, WG-Worksheet group work, OG-Other group work, AaQ-Answer Q, SQ-Student Q, WC-Whole class discuss, Pd-Predicting, SP-Student present, TQ-Test/quiz, W-Waiting, O-Other
 2. Lec-Lecturing, RW-Writing, FU-Follow-up, PQ-Pose Q, CQ-Clicker Q, AaQ-Answer Q, MG-Moving/Guiding, 1a1-One-on-one, DV-Demon, Adm-Admin, W-Waiting, O-Other

For each 2 minute interval, check columns to show what's happening in each category (or draw vertical line to indicate continuation of activity). Check multiple columns where appropriate.

min	1. Students doing										2. Instructor doing										3. Engagement			Comments: EG: explain difficult coding choices, flag key points for feedback for the instructor, identify good analogies, etc.										
	L	Ind	CG	WG	OG	AaQ	SQ	WC	Pd	SP	TQ	W	O	Lec	RW	FU	PQ	CQ	AaQ	MG	1a1	DV	Adm		W	O	L	M	W					
0-2																																		
2																																		
4																																		
6																																		
8-10																																		

The protocol has three types of codes. The codes and what they signify are main parts as listed below:

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

3. Student Engagement (optional)

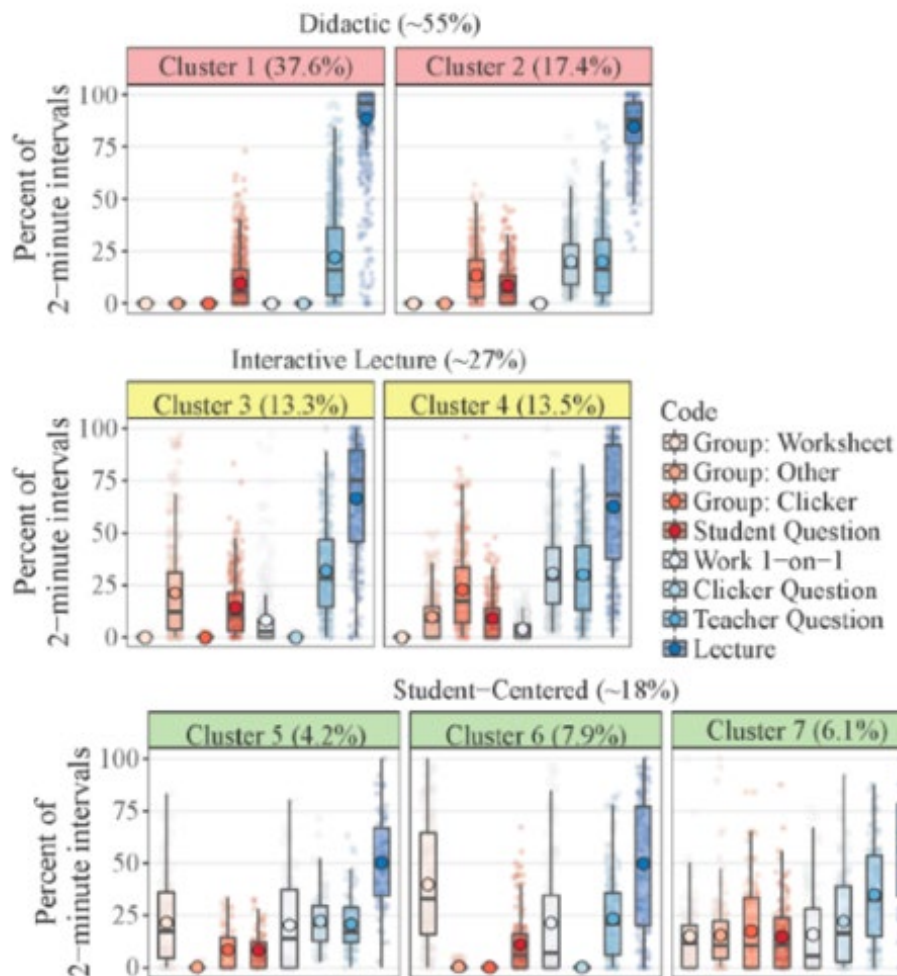
- L Small fraction (10-20%) obviously engaged.
- M Substantial fractions both clearly engaged and clearly not engaged.
- H Large fraction of students (80+% clearly engaged in class activity or listening to instructor.

Student engagement alternatives:

- (1) Just mark when engagement is obviously high or obviously low.*
- (2) Count "N" students near you (~10) and assess how many appear engaged at every 2 minute interval. Enter value for all engaged instead of L/M/H. NOTE what your value of N was.*

Instructional Profiles

Based on Stains et. al (2018)'s research, analysis of COPUS observations results in three main categories (Instructional Profiles) represented by 7 clusters as shown below.



Didactic Instruction Clusters

- Cluster 1 falls under Didactic Instruction. This mode of instruction contains around 80% lecture with minimal student involvement. Cluster 1 has no observed student involvement except sporadic questions from and to the students.
- Cluster 2 falls under Didactic Instruction. This mode of instruction contains around 80% lecture with minimal student involvement. Cluster 2 has clicker questions that are sometimes associated with group work.

Interactive Lecture Clusters

- Cluster 3 falls under Interactive Lectures. This mode of instruction supplements lectures with student-centered strategies. Cluster 3 might contain clicker questions that are sometimes associated with group work.

- Cluster 4 falls under Interactive Lectures. This mode of instruction supplements lectures with student-centered strategies. Cluster 4 represents lectures with clicker questions and group work.

Student-Centered Clusters

- Cluster 5 falls under Student Centered Instruction. This mode of instruction supplements lectures with student-centered strategies, primarily through group worksheets and questions and one-on-one assistance from the instructor.
- Cluster 6 falls under Student Centered Instruction. This mode of instruction supplements lectures with student-centered strategies in large portions, primarily through group worksheets and assistance and questions from the instructor.
- Cluster 7 falls under Student Centered Instruction. This mode of instruction supplements lectures with student-centered strategies in large portions. Cluster 7 is defined as represents a variety of group work strategies with less consistent usage.

References

Smith, M. K., Jones, F. H., Gilbert, S. L., & Wieman, C. E. (2013). The Classroom Observation Protocol for Undergraduate STEM (COPUS): A new instrument to characterize university STEM classroom practices. *CBE—Life Sciences Education*, 12(4), 618-627.

Stains, M., Harshman, J., Barker, M. K., Chasteen, S. V., Cole, R., DeChenne-Peters, S. E., ... & Young, A. M. (2018). Anatomy of STEM teaching in North American universities. *Science*, 359(6383), 1468-1470.