

Documenting Change and Supporting Course Redesign with the COPUS Classroom Observation Tool

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Active Learning Initiative

Goal: To support faculty in redesigning their courses to implement active learning strategies



Class observations: key tool for
faculty reflection
&
program evaluation

Session Objectives

- Understand what the COPUS observation tool is and how it is used
- Explore the ways that COPUS data can be used both for faculty reflection and program evaluation
- Consider how to analyze COPUS data to answer specific research questions
- Hypothesize about how COPUS variables might vary over time or across courses
- Consider using this tool in your professional contexts



COPUS: Course Observation Protocol for Undergraduate STEM*



Structured observation tool

Developed by Michelle Smith to document active learning practices in classrooms

Also works well in humanities and social sciences courses

* Smith, M. K. et al. (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.

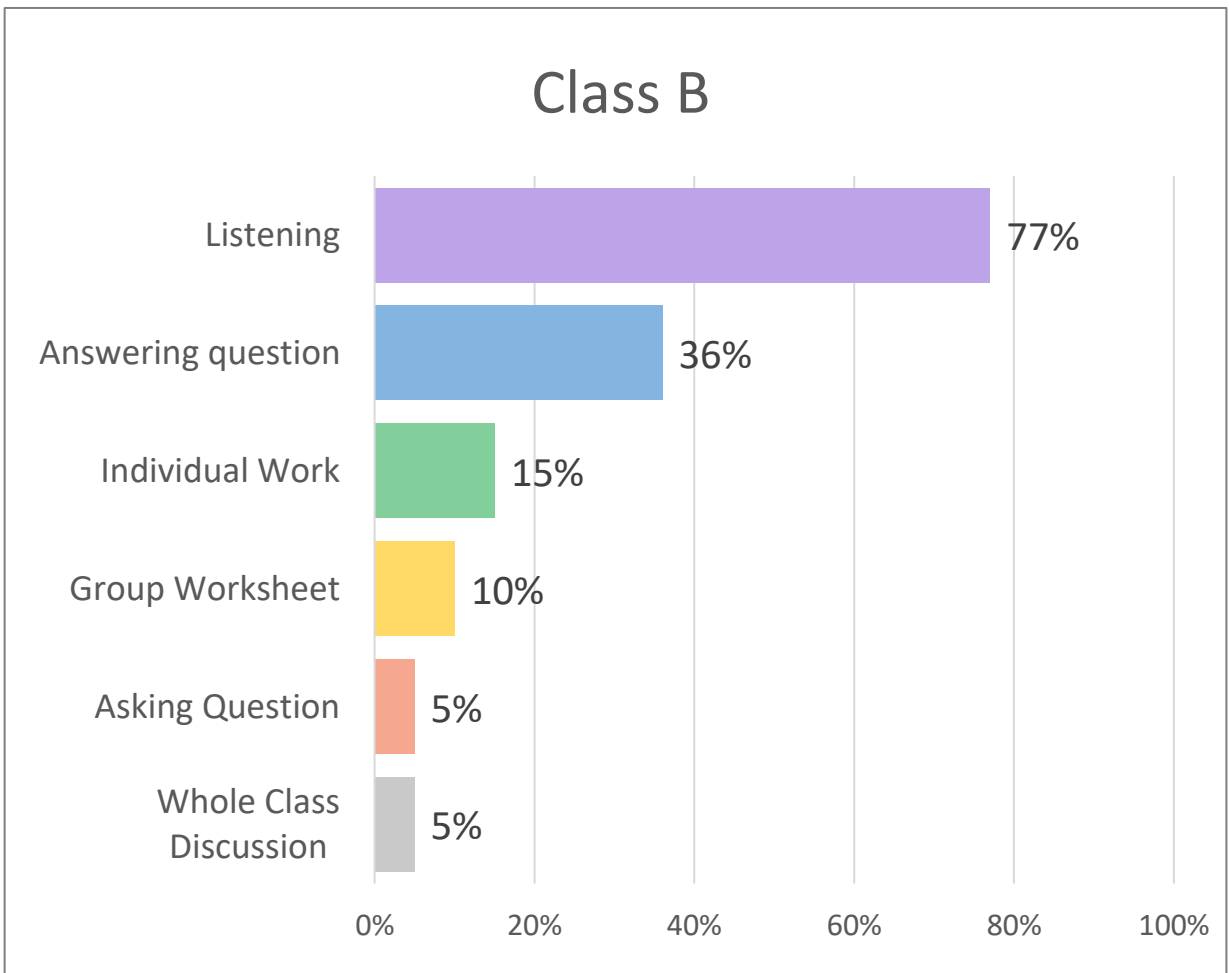
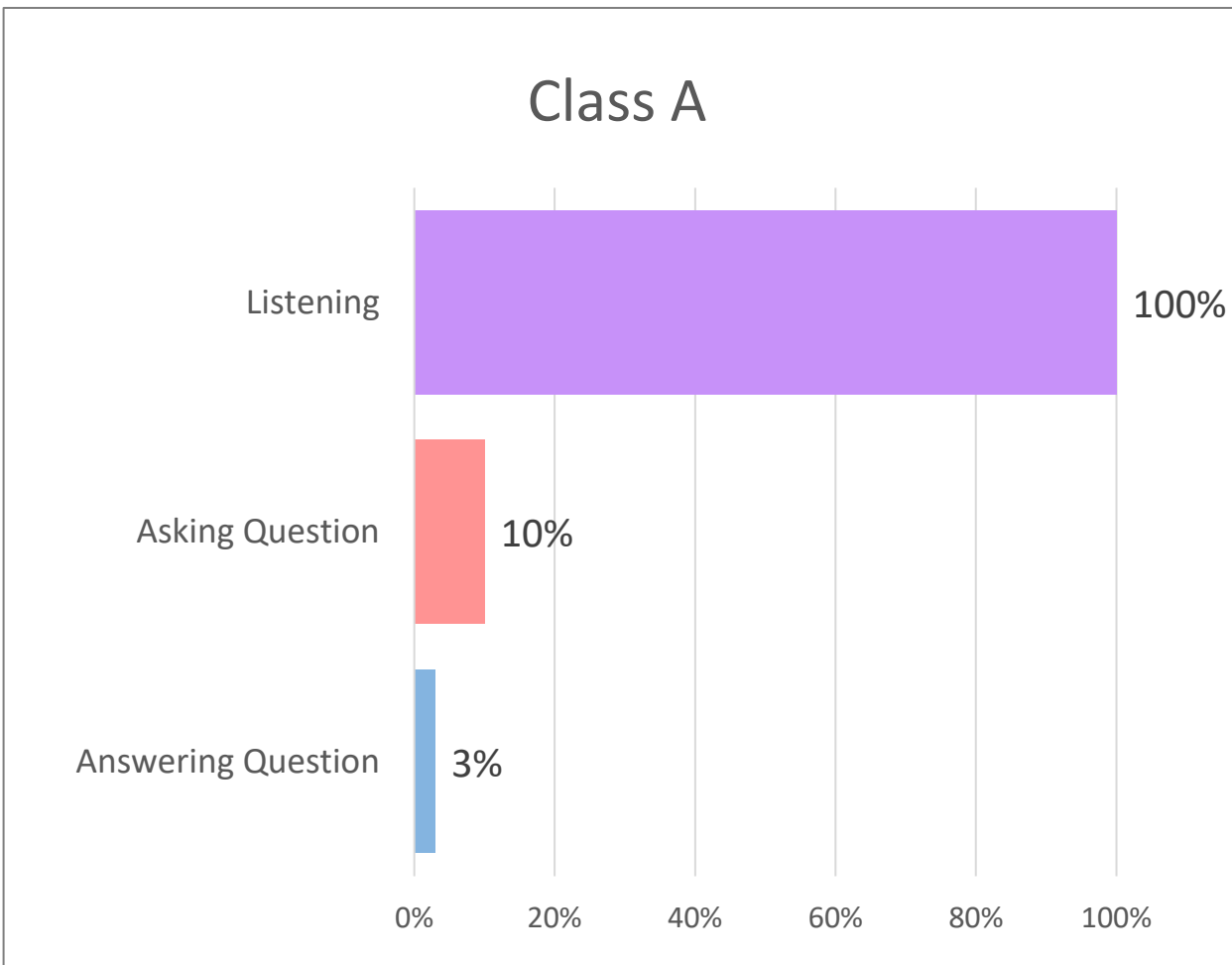
COPUS: Course Observation Protocol for Undergraduate STEM*



If you were observing a class, what student behaviors would you want to record? Please post in chat.

Student Behaviors During Class

Percent of Time



- Voluntary
- Private report for instructors
- Paired with conversations about teaching
- 2 or 3 observations a semester (more may be needed for research projects)
- Included in our IRB protocol



COPUS Instructor Practices

Presenting

Lecturing

Writing

Demonstration or video

Guiding

Asking question

Answering question

Moving around the room

One-on-one with student(s)

Following up on problem/activity

Excerpt of instructor coding sheet cells

Comments		Instructor Doing												
Minutes	Lecturing	Writing	Following Up on Problem	Posing Question	Polling Question	Answering Question	Moving & Guiding	Helping One-on-One	Demo or Video	Admin /Logistics	Waiting	Other		
0														
2														
4														
6														
8														
10														

Each row is a 2-min Time Interval

COPUS Instructor Practices Example

		Instructor Doing												
Minutes	Lecturing	Writing	Following Up on Problem/Activity	Posing Question	Polling Question	Answering Student Question	Moving & Guiding	Helping One-on-One	Showing Demo or Video	Course Admin /Logistics	Waiting	Other		
0	X					X								
2				X										

0-2 Minutes

2-4 Minutes

COPUS Student Activities

Receiving

Listening

Watching a demonstration/video

Working

Individual thinking

Discussing polling questions

Collaborating - group worksheets

Making a prediction

Taking a test

Talking to Class

Asking questions

Answering questions

Whole class discussion

Presenting

COPUS Student Activity Example

		Students Doing												
Minutes	Listening	Working Independently	Group Polling Question	Group Worksheet	Other Group Work	Answering Question	Asking Question	Class Discussion	Making Prediction	Presenting Work	Taking Test	Waiting	Other	
0	X						X							
2		X			X									

0-2 Minutes

2-4 Minutes

COPUS for reflection & program evaluation

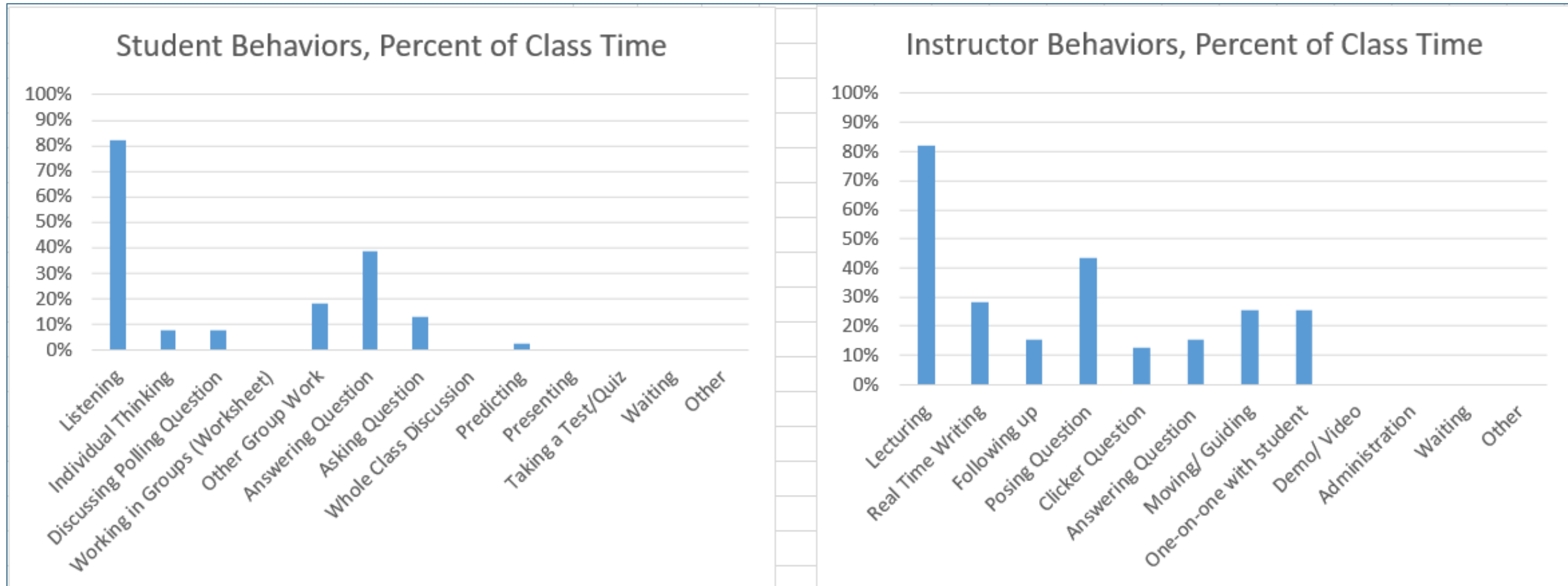
1 Faculty reflection

- Observation highlights
- Data report

2 Program evaluation

- Over time
- Across courses
- Across departments

COPUS for reflection



Post your thoughts in the chat:

What is something positive this data tells us about the classroom experience?

COPUS for program evaluation

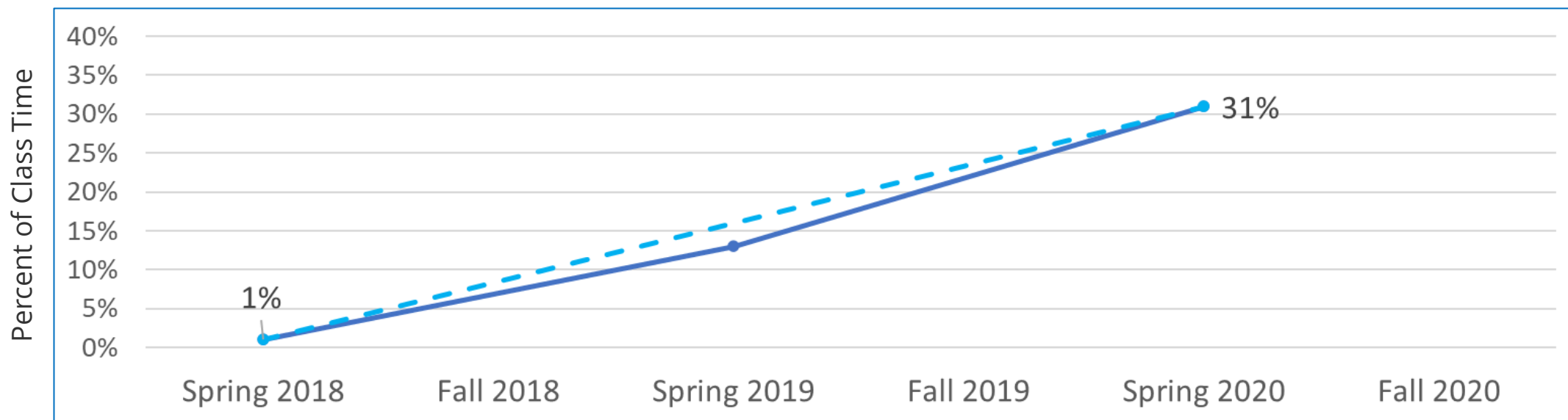
Evaluation Question:

Will the percent of class time
spent on groupwork increase over time?

Student Groupwork Activities Increase: *Sometimes shows steady growth*

- Solid blue line shows actual percentages for each semester
- Dashed blue line shows the trendline from first to last observation

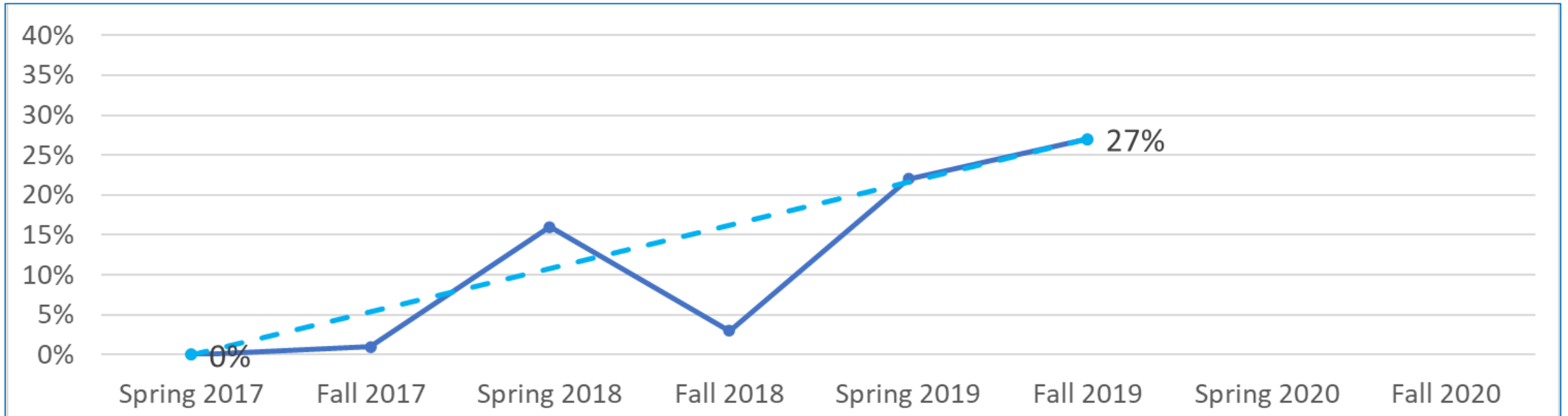
Percent of Class Time Spent on Groupwork by Semester



Thanks to Sneha Mishra who conducted data analysis for these graphs.

Student Groupwork Activities Increase: *Common sources of variation*

Percent of Class Time Spent on Groupwork by Semester

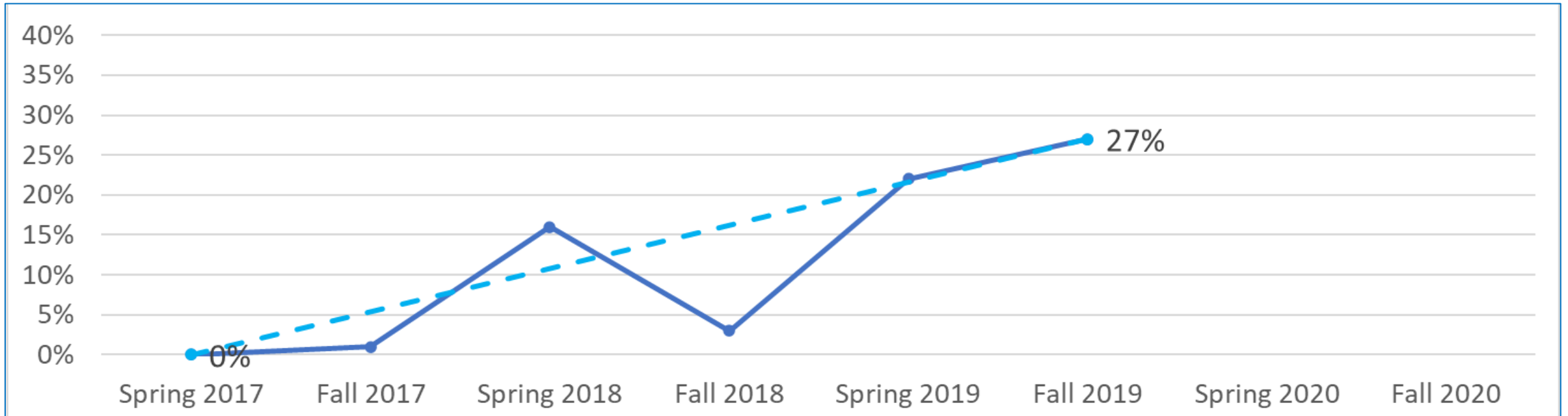


Post your thoughts in the chat:

Why might there be so much variation between semesters?

Student Groupwork Activities Increase: *Common sources of variation*

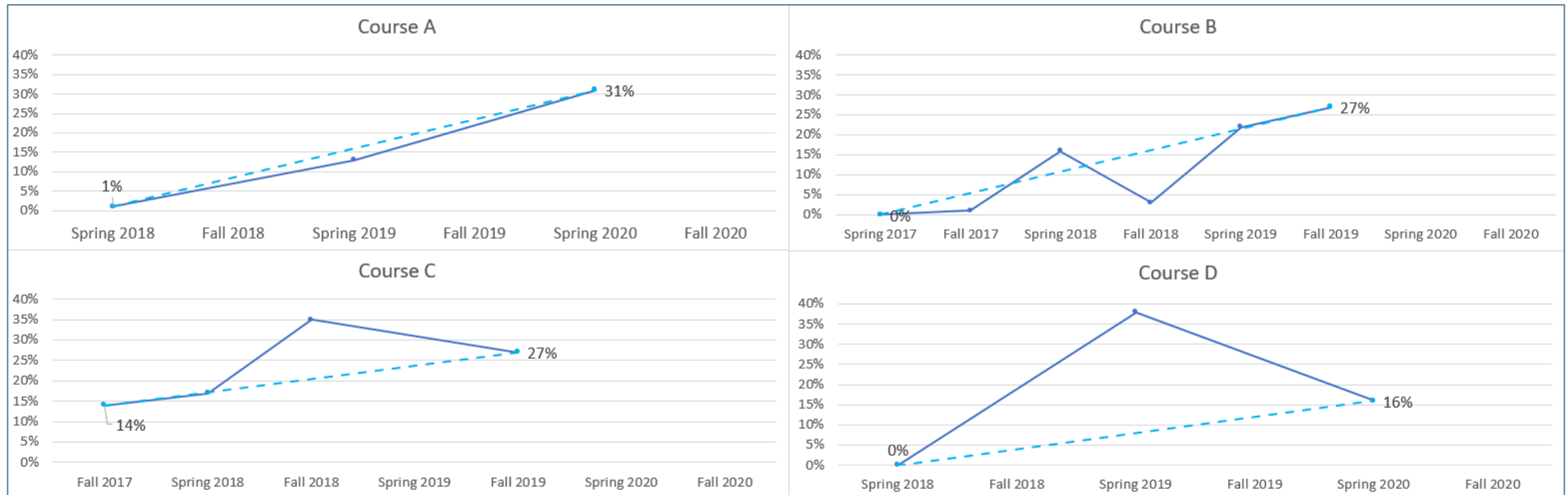
Percent of Class Time Spent on Groupwork by Semester



- Course innovations
 - Different instructors across semesters
 - Groupwork varying by day within a course

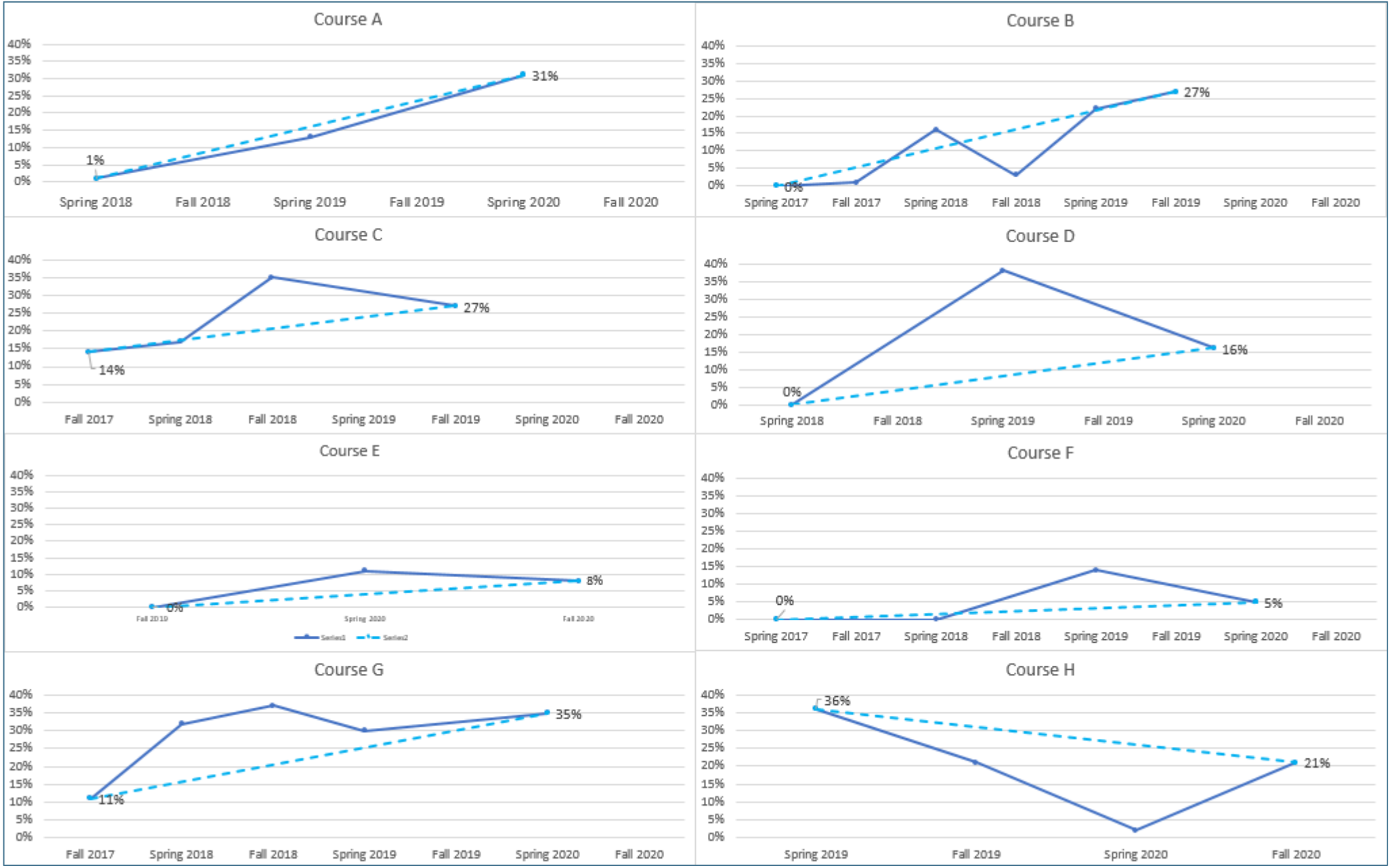
Student Groupwork Activities Increasing:

Across courses, it can be difficult to summarize authentically.



Articulating Trends

- 7 of 8 courses show overall increases.
- Among those 7, overall increases ranged from 5 to 30 percentage points.



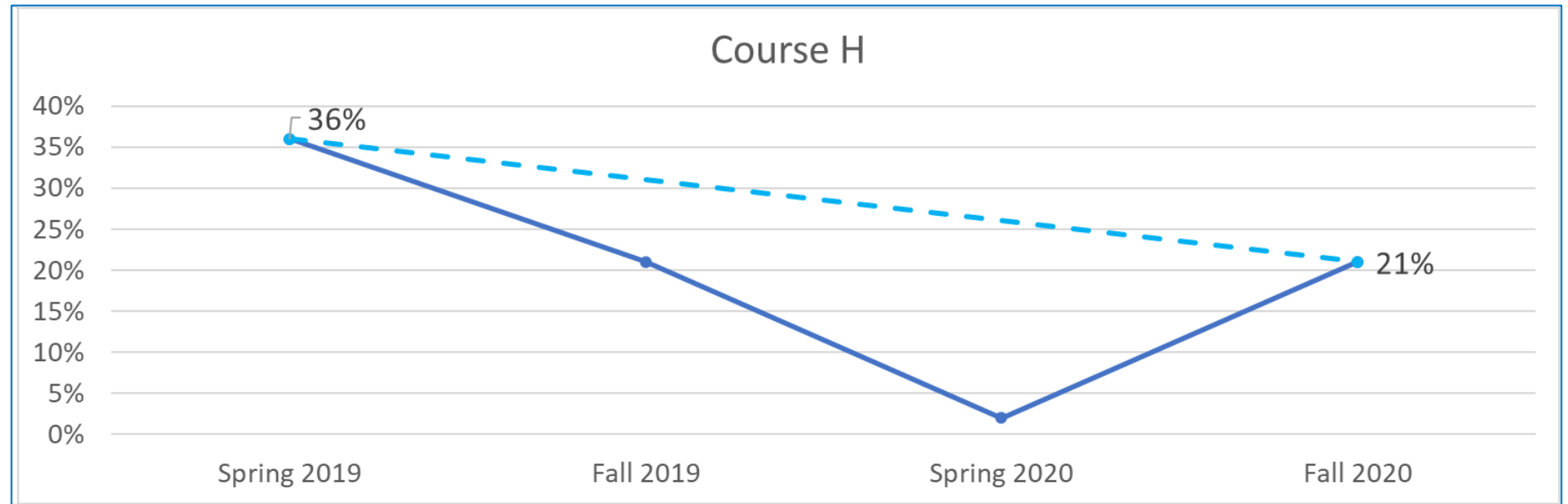
Contrary Case

One instance of
15pp decrease.

Note the
relatively high
starting point:

36% of class time
was groupwork
in the first
semester.

Percent of Class Time Spent on Groupwork by Semester



Program planning with COPUS:

Considering resources

Purpose	Necessary resources
Using tool	Class observation time + light prep
Sharing data for one observation	Instructor meeting time
Sharing aggregated data	Data cleaning, analysis, reporting
Analyzing for evaluation purposes	Data cleaning, analysis, reporting

Wrap Up

COPUS can support different roles offering a unique lens for reflection

- Faculty reflection: Tangible record for reference
- Program evaluation: Can track change across classes and semesters

COPUS references

- COPUS training guide and observation log:

<https://cwsei.ubc.ca/resources/tools/copus>

- Helpful citations:

Lund, T. J. et al. The Best of Both Worlds: Building on the COPUS and RTOP Observation Protocols to Easily and Reliably Measure Various Levels of Reformed Instructional Practice. *CBE Life Sciences Education*, 14(2). <https://doi.org/10.1187/cbe.14-10-0168>

McConnell, M. et al. (2021). Interpret with Caution: COPUS Instructional Styles May Not Differ in Terms of Practices That Support Student Learning. *CBE—Life Sciences Education*, 20(2), ar26. <https://doi.org/10.1187/cbe.20-09-0218>

Smith, M. K. et al. (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. <https://doi.org/10.1187/cbe.13-08-0154>

Smith, M. K. et al. (2014). A Campus-Wide Study of STEM Courses: New Perspectives on Teaching Practices and Perceptions. *CBE Life Sciences Education*, 13(4), 624–635. <https://doi.org/10.1187/cbe.14-06-0108>

Stains, M. et al. (2018). Anatomy of STEM Teaching in American Universities: A Snapshot from a Large-Scale Observation Study. *Science (New York, N.Y.)*, 359(6383), 1468–1470. <https://doi.org/10.1126/science.aap8892>

Wieman, C. (2021). Response to “Interpret with Caution: COPUS Instructional Styles May Not Differ in Terms of Practices That Support Student Learning,” by Melody McConnell, Jeffrey Boyer, Lisa M. Montplaisir, Jessie B. Arneson, Rachel L. S. Harding, Brian Farlow, and Erika G. Offerdahl. *CBE—Life Sciences Education*, 20(3), 1e1. <https://doi.org/10.1187/cbe.21-05-0126>

Final Reflection

Consider how the COPUS could be useful in your professional context. What benefits or challenges do you foresee?

Questions?

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Thank you