A New Classroom Practices Observation Protocol.

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EOS-SEI Science Education Initiative

ABSTRACT: A new observation procedure is being developed aimed at helping characterize instructional practices, student actions, "Bloom's levels" and other classroom characteristics, on a timeline of the class. The intention is to develop a procedure that is useful for characterizing any type of class, rather than to make judgments about "quality" in any sense. Preliminary examples of trials are shown with some possibilities for analysis; including comparisons of several classes from *one* course, & single classes from 16 *different* courses.

Potential purposes
- Characterize courses:
  - Student experiences, instructor actions, others
- Course Transformations Impact Assessments
  - After transformation; pre-post if possible
- Compare courses … eg. all 1xx; core vs. elective; etc.
  - Busy / idle students; balance of motivation, basics, context; theory / practical; etc.
- Professional and peer development for instructors:
  - Based on code patterns and observer feedback.

Precedent
- EOS – "engagement observation protocol" (E. Lane)
  - Included in CPOP
- UBC
  - Physics feedback forms (P. Newbury and C. Heiner)
- RTOP – Reformed Teaching Observations Protocol
- TDOP[1] – Teaching Dimensions Observation Protocol1
  - Foundation of CPOP
  - Explored in Math (W. Code)

Data

Trials to date: EOAS courses:
1xx courses: 4   2xx courses: 5
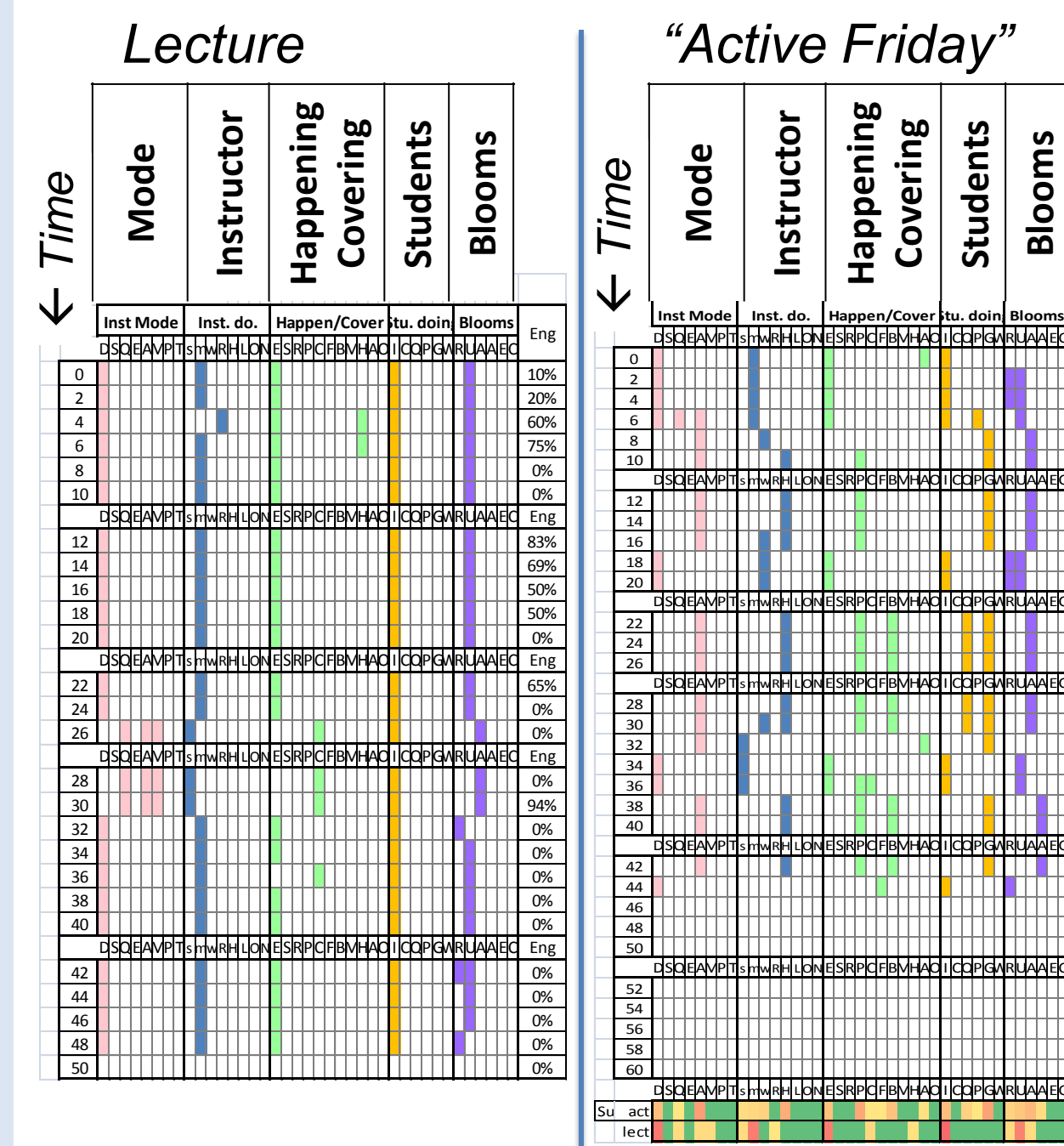3xx courses: 7   Eosc222: 12 classes, Jan-March

Procedure and data:
- Observation form stabile at version 10.
- Forms printed on LiveScribe paper.
- Audio records are keyed to coding on forms.
- Coded forms transferred to spreadsheet template, including color and aggregation.

Transcribed raw data: 2 classes of eosc326

Lecture   *"Active Friday"*

Completed raw data form

8.5 x 11 Raw CPOP form

Observation Codes

Instructional mode
- D Delivery (lecture, probs., Stu. q'ns, etc. … see "Happening")
- E Experiment / Simulation / Demo
- M Media: Video, Anim'n, photo (other than usual ppt)
- S Socratic (continuous question posing)
- Q Question to students, not Socratic (open, simple clicker, etc.)
- A Active students (eg clicker sequence, worksheets, etc.)
- P Presentation by student(s)
- T Test or quiz (include groups if two-stage or TBL, etc.)

Instructor is doing …
- s Static or low key - Talking
- m moving, interacting with screen, etc. - Talking
- w Wandering around class - Talking
- R Real time writing (board, doc. projector, etc.)
- H Helping or guiding student work (eg circulating)
- L Listening or marking (during presentations etc.)
- O One-on-one: focus on individual (class may be listening)
- N Nothing – waiting for activity, etc.

Happening or covering
- E Explain new content, knowledge or procedure
- S Summarizing or synthesizing
- R Review, revisit, refer to prior content OR knowledge framework.
- P Practice/Apply; problem, thinking, analysis, etc.
- C Case study or example(real world); may be with "P"
- F Follow up, feedback on work of thinking.
- B Brainstorming or novel thinking
- M Motivational ("here's why we're doing this", etc.)
- H Humor or just friendly
- A Administration (assign hmwrk, return tests, etc)
- O Other – explain in comments.

Students Doing
- I Individual (listening or doing)
- C Contributing (e.g. explain in turns, etc.)
- Q Student asks question
- P Pairs (or peer instruction)
- G Groups (note group size in comments)
- W Whole class ("shout out", discussion, etc)

Blooms Taxonomy level (updated – more action oriented)
- R/U remembering / understanding
- A/A applying / analyzing
- E/C evaluating / creating
Judge based on verbs that are in use (instructor or activity).

Blooms Taxonomy level (original from 1956)
- K / C knowledge / comprehension
- A / A application / analysis
- S / E synthesis / evaluation

Eng = Engagement observations: Here's how to do this …
1) Select N students to observe.
2) Enter "X/N" = count of #students engaged (or not "disengaged") in what's going on.

Key: "Key Flag" helps identify key messages for feedback to the instructor.

Some Patterns – 19 different classes

Sorted by Blooms score (see codes, below left)

low Bloom:
- mostly 1st, 2nd yr. (BUT see exceptions)
- high "telling" instr. Mode
- high "explain or review" cover

high Bloom:
- mostly 2nd, 3rd yr. (BUT see exceptions)
- more students working together
- exception is eosc222 poster session

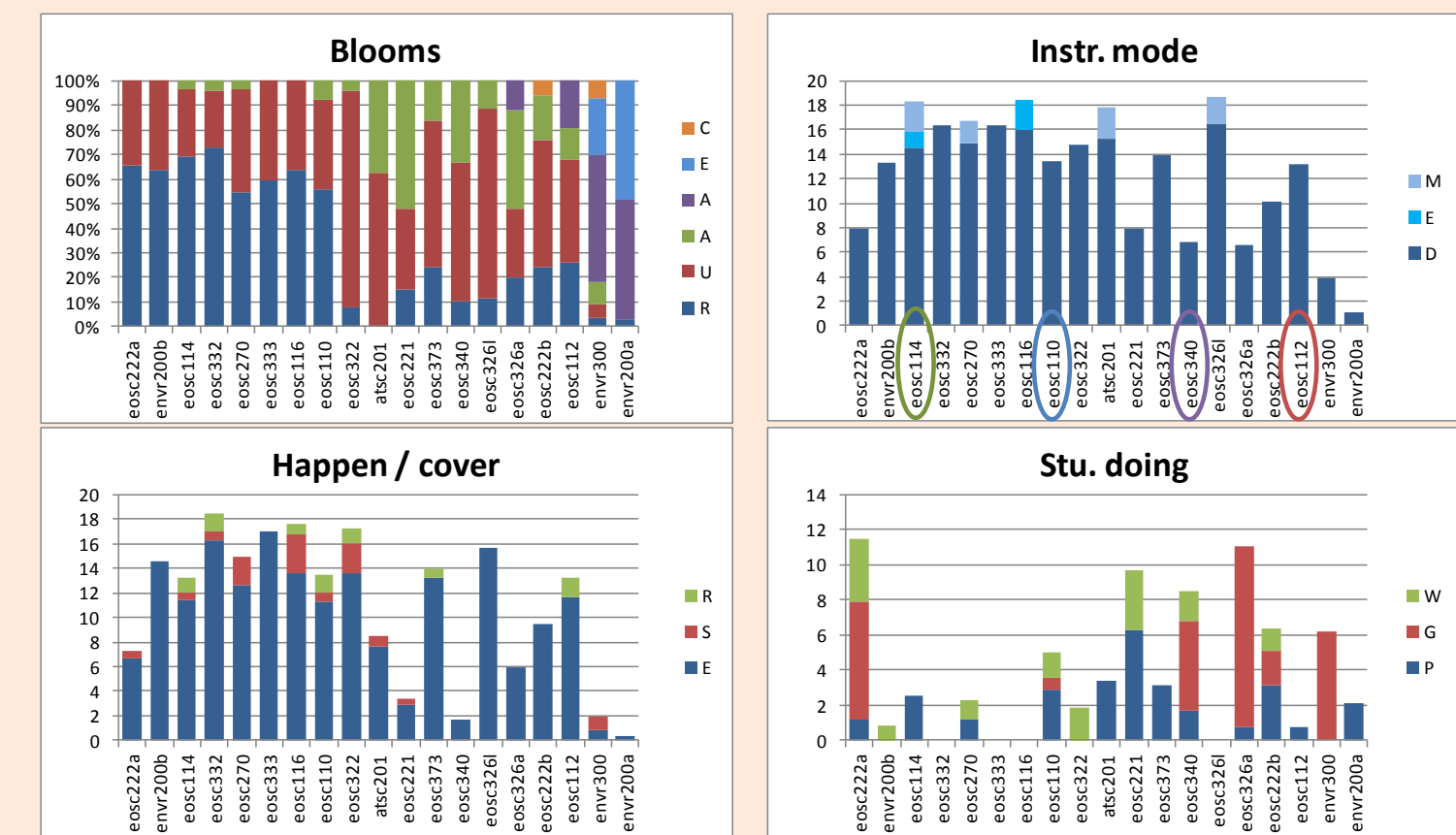**eosc112**
- high blooms, but…
- low engagement

eosc114
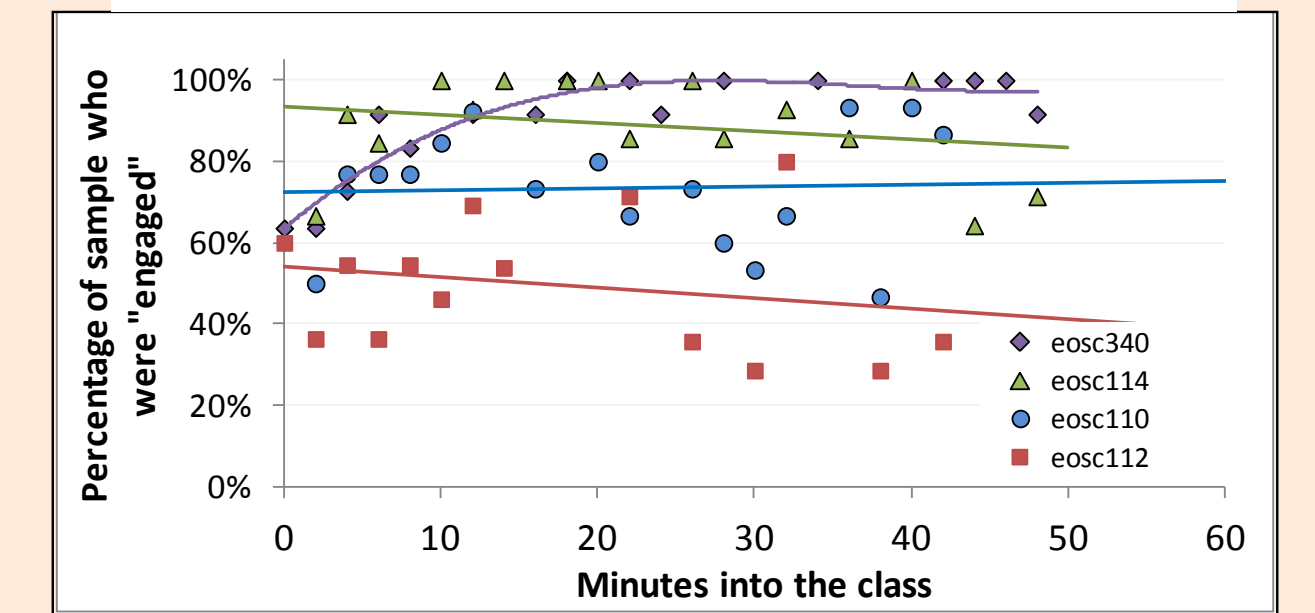- low blooms, but…
- strong engagement

envr300
- high blooms, and..
- most diverse instructor doing
- All guided group work

eosc340
- moderate blooms
- very low "explaining"
- diverse instr. & stu. doing
- engage starts low stays high throughout

Engagement: 4 courses, 1 class each

Characteristics and participation in SEI

Data recorded at 2-minute intervals in 1st, 2nd and 3rd yr courses.

NOTES and caveats:
- Each course was observed only once, and no information is used relating to what students do outside of class.
- Also, the observation protocol has not yet been validated by having several people conduct simultaneous observations.
- There may be other shortcomings; the project is definitely in only the "development" stages.

Some features to notice:
- The "Not eosc" courses were active & application oriented, but did not use groups or peers much.
- "No SEI": These involved more delivery, more telling, and more solo time in class.
- "SEI applied" tended to be more active, applying, in groups, and there is also a wider variety.

Comparing two science electives:

Instructional mode   *Students doing*

EOSC 340 Climate change
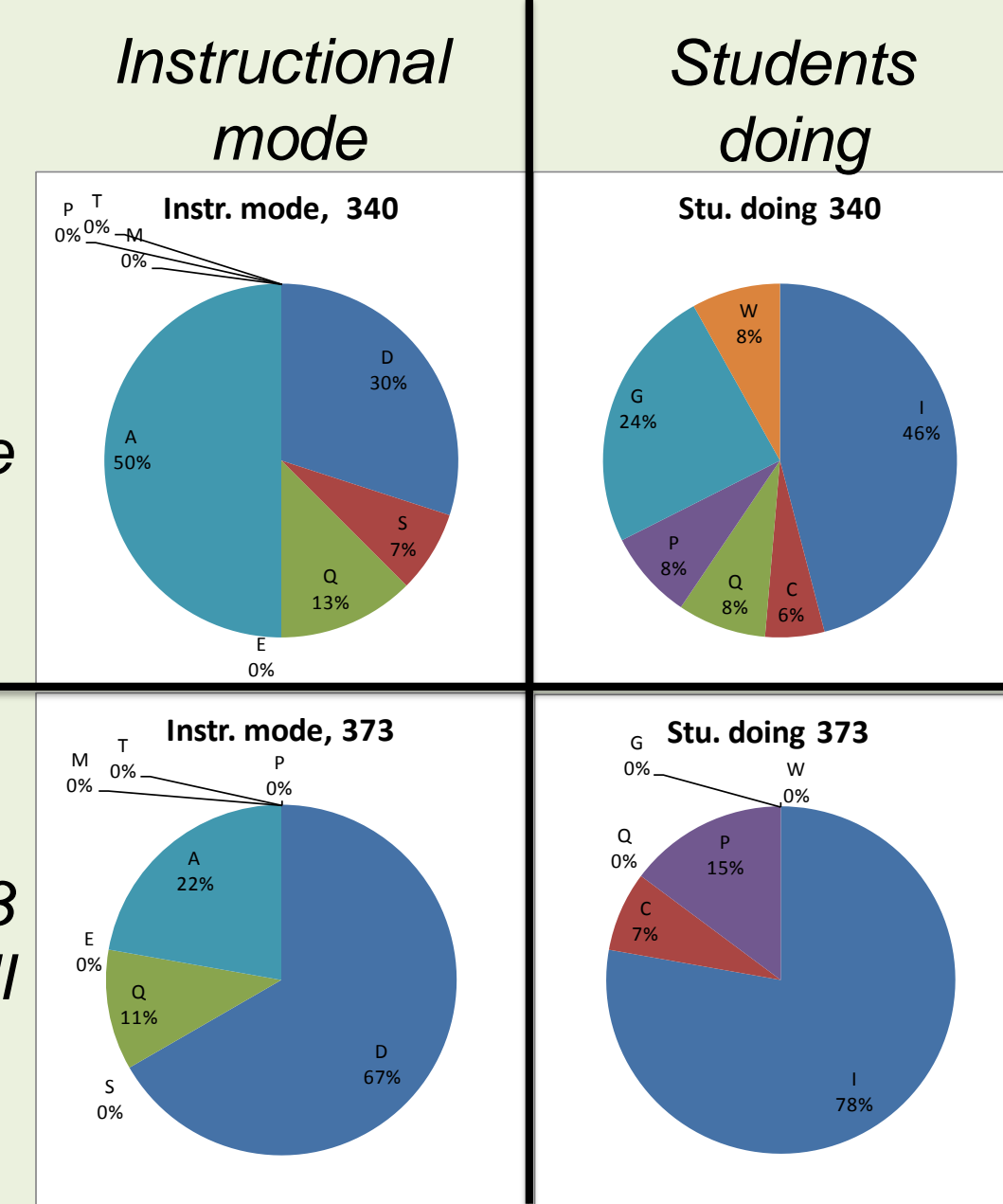
EOSC 373 Oceanography II

Six weeks of EOSC222 classes:
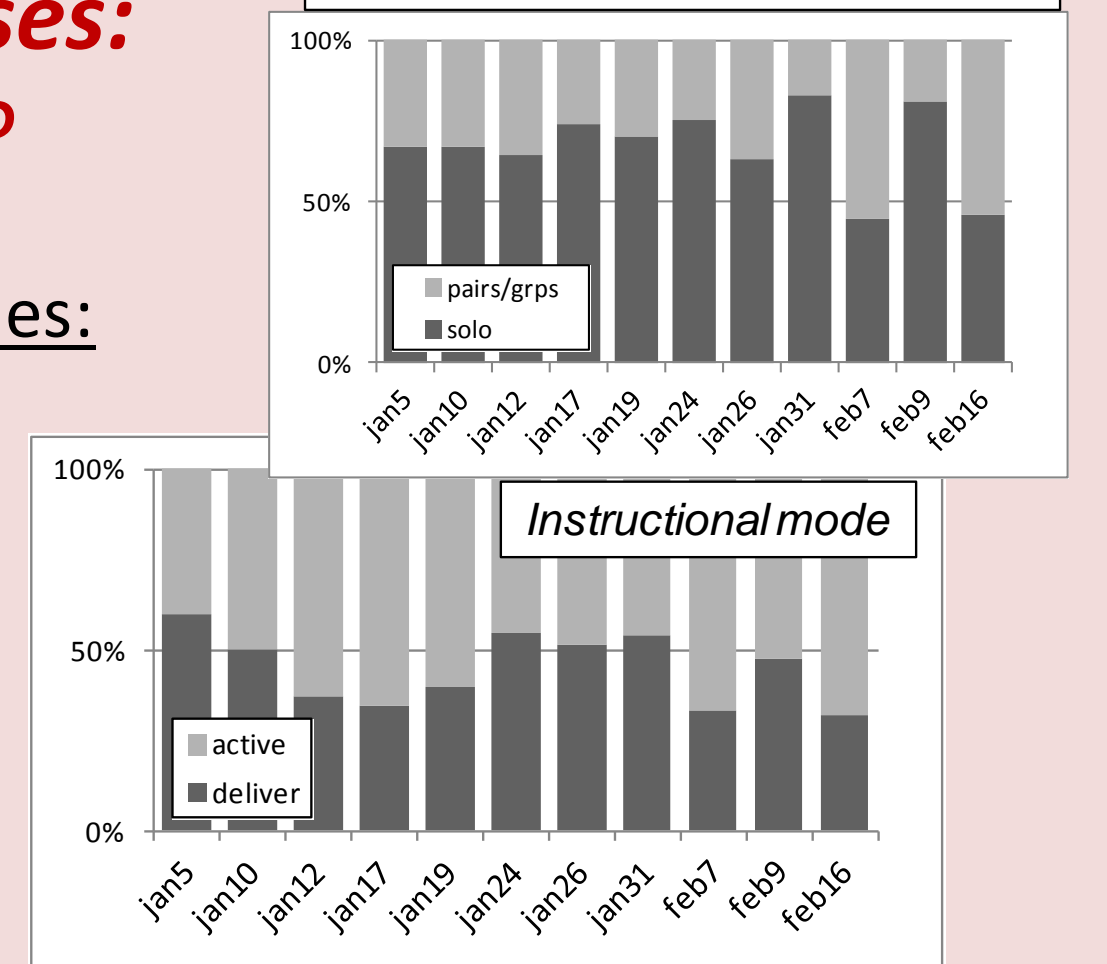### What analysis possibilities?

Address questions by combining codes:

Students: solo vs. pairs or groups

Instructional mode

Variations versus time:
- More group work in Feb.
- "Active" tends to follows basics.

Sort by Bloom's score:

$$Score = 1*R + 2*U + 3*A + 4*A + 5*E + 6*U$$

- Higher Blooms … more active.