EOAS-SEI Earth, Ocean and Atmospheric Sciences, May 2018

Creative, peer-reviewed projects in very large classes

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Context

- **Project funding**: Large TLEF
- **Course**: EOSC114, Natural Disasters
- **Students**: 1500-2000 in **8** f2f and DE sections / year
- **Demographics:** 1st – 4th year, all degrees
- **Instructors** change for each of 6 modules
- **Admin. instructor** provides 'stability'

This project's objectives

Enable students from ALL disciplines to …

- … practice reading & applying scientific thinking
- … practice peer review
- … assess thinking skills, attitudes & knowledge
- … have some elements of choice
- … contribution creatively to a class-wide resource.

Course structure

How are '*creative projects*' situated within the course?

Previous Model

1. Modules: **7**
2. Classes: lectures +
   - some clickers
   - a few worksheets
3. Homework: **0**
4. "Practice quizzes": **7**
5. Tests: **3** midterms + final
6. All tests:
   - 2-stage mult. choice

Current Model

1. Modules: **7**
2. Classes: lectures +
   - some clickers
   - a few worksheets
3. Homework: **6**
   - Prior knowledge check: **1**
   - Scientific readings: **5** types
   - Worksheet → submit online
4. Mini-project, distributed as part of homework.
5. "Practice quizzes": **0**
6. Tests: **3** midterms + final
7. All tests: 2-stage mult. choice.

Focus of this poster

Miniprojects for students

Teaching objectives

1. Enhance student motivation & personal interest.
2. Expose students to experiences & interests of colleagues.
3. Explore strategies for creative learning in large classes.
4. Explore peer review options for very large classes.

Learning goals for projects

1. Create/share personally relevant peer reviewed content.
2. Increase google mapping & research skills.
3. Relate course-wide framework concepts to personally interesting events.
4. Characterize global distributions of natural hazards and classmates' interests / experiences.

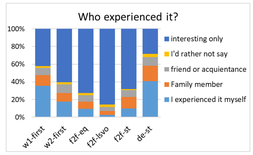
Achievements to date

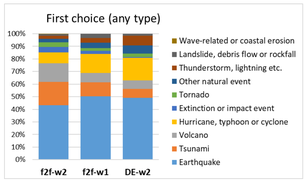
1. Maps & info from hundreds of student submission
2. Predict results; follow up by revisiting maps
3. Online database of hazards for future student entries
4. Pilot: submit / characterize sources, images, q's, etc.
5. Pilot: automated assessment strategies
6. Pilot: Self-assessment emulating peer assessment
7. Pilot: Synthetic versions of peer review (two tries)

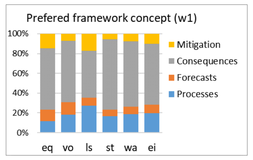
After two terms: Fall 2017 and Winter 2018

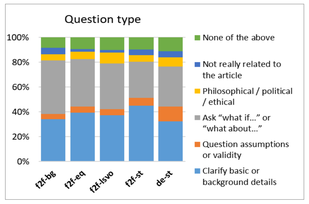
Students' chosen events include:

- Willing to make public: **f2f** = *83%;* **DE** = *77%*
- Who experience it →
- Type of event →
- Course framework concept of interest →
- Information source & type
- Question to authors & type →
- Image & caption & type
- Written description: *60-100* words









Time on task: - **each map**: *40* ± *18* mins.
- **each review**: *55* ± *30* mins.
- **Reading homework**: **f2f**= *2.3* ± *1.4*hrs; **de**= *3.3* ± *2.4*hrs

Miniproject sequence: first attempt, second, and planned for Fall 20218

First pilot, 2017w1

1. Map 1: Any event (eg. given)
2. Map 2: Earthquake event
3. Map 3: Volcano event
4. Map 4: Landslide event
5. Map 5: Storm event
6. Map 6: Wave/coastal event
7. Map 7: Favorite event +
   - Pilot peer eval'n with self-assess questions +
   - Survey

Second pilot, 2017w2

1. Map 1: Any event
2. Map 2: EQ event
3. Q'n set re. map 1 (**G**) +
   - Peer-review pilot A: 3 entries
4. Map 3: VO or LS event
5. Map 4: ST event +
   - predict storms map pattern
6. Q'n set re. map 4 (**G**) +
   - follow up predictions +
   - Peer-review pilot B: compare 3

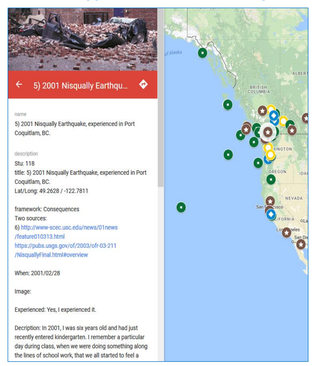
Third version plan, 2018w1

1. Map 1 (any) + ComPair training (**G**)
2. Map 2 (eq) + map 1 qns (**G**)
3. Review map 2 + followup
4. Map 3 (vo / ls) + map 2 qns (**G**)
5. Review map 3 + followup
6. Map 4 (st / wa) + map 3 qns (**G**)
7. Map 5 = augment a favorite. (**~G**)

(**G**) = graded

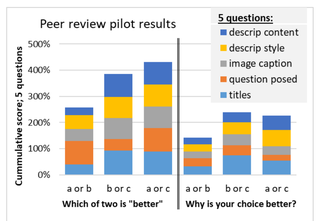
Miniproject result - part 1: whole map, 459 entries

Typical student's entry



Peer review strategy – pilot

- Worked well:
  - Specific questions about "correctness" of entries.
  - Predicting results & subsequent follow-up.
  - Questions upon review of whole maps.
- Worked but needs improvement: →
  - Peer review: choose best of two
- Did not work well ↗
  - Peer review: rubric for comparing two entries.
- Students perception of clarity and difficulty: →
  - Split 50/50 on easy/difficult vs clear/confusing



Tasks were …	easy	difficult	
clear	24%	21%	45%
confusing	25%	31%	55%
	49%	51%	

Successes: lessons learned so far

- Student feedback confirms miniproject is motivational.
- Prediction + map review: students like using results.
- Students appreciate choice & freedom to pursue interests
- Open-ended qns are well-answered even if not graded.
- Worksheet → LMS submission enables assessment + maps.
- Maps via fusion table: takes TA ~1/2 hr using a template.

Challenges: lessons learned so far

- Piloting in Connect for deployment in Canvas is costly.
- Students don't visit results unless 'required'.
- Maintenance & improvement of homework & active learning requires instructor buy-in & commitment. But …
- … course *structure* inhibits agile course evolution. (*Structure*: 6 instructors, f2f = DE, demographics, etc.)

Next steps

See "Third version plan", to the left.

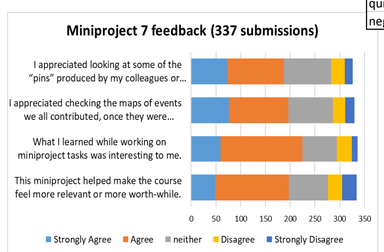
- Conversion to Canvas:
  - Trials in 2018s, fully implement 2018W1.
- Clarify peer review decision making: Employ ***ComPair***. Ask:
  - Which is better - A or B?
  - Incorporate 4-5 criteria, 2 of which are "open-ended".
  - Require feedback to both entry.
  - Scaffold this skill with models and a training step.
  - Compare 4-6 anonymous pairs.
- Increase graded revisiting of maps.
- Balance repetition and variety of tasks.
- Re-introduce an augmented final "favorite" entry.
- Analyze student results by demographics.

Conclusions to date:

- Students like making to & revisiting maps.
- Worksheets + LMS + fusion table enables …
  → efficient delivery, assessment & display.
- Peer review: partial success; needs adjusting.
- "Cost" to instructor & TA is manageable.
- Student perceptions: overwhelmingly positive

"How to make it more interesting, efficient or helpful for learning?"	
Feedback comment codes	**% of 100 samples**
no change	23%
add research, personal info., more details, etc.	21%
guidelines, expectations, relation to tests	20%
structure: sequence, closer relation to lectures	13%
different or shorter questions	10%
timing or process of submission	8%
partners, team or group work	7%
negative comment	4%

"What did you like, or do you think worked well?"	
Feedback comment codes	**% of 100 samples**
Supports self-interest and choice	30%
expand beyond assigned learning	25%
maps; seeing my & others' entries	16%
helped with learning	13%
real life connection	11%
Helped see the big picture	10%
other	9%
reuse of prior work	8%
quick - easy	7%
negative	4%



Acknowledgements

- **L. Porrit, instructor/admin:** support, advise, patience
- **S. Harris, official PI:** ongoing support & encouragement.
- **R. Stull, eosc114 originator:** advocate & contributor.
- **M. Ver, DE instructor:** willing to pilot in DE.
- **STUDENTS:** for enthusiastic engagement & thoughtful feedback.
- **TLEF**: endorsing and funding the project.