Student Projects at all Levels, in ATSC, ENVR, EOSC Courses, EOS

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Initial outcomes from a lunchtime conversation about student projects in EOS

Fourteen EOS faculty met Dec 14th 2011 for between 1 and 2 hours to share types of projects they have students do in atsc, envr, eosc courses at 1xx, 2xx, 3xx, 4xx, and 5xx levels. Thanks to participants for providing information, experience and wisdom, and to those who emailed us information. Some results from conversations AND from emailed summaries obtained some weeks before the meeting follow. **Highlights are (a) many projects!, (b) ~40% involve group work, (c) projects with >100 students are possible, (d) writing is a prominent goal AND challenge.**

How many projects and students did we hear about?

# projects by format:	
group work	14
individual	19
group and indiv	3
TOTALS	**36**

# students involved	
#stu	**#courses**
<=5	4
5-19	7
20-39	5
40-59	6
60-99	2
100-199	3
>=200	1

# courses (wrkshp/email)		
subject	*wksp*	*email*
atsc	1	2
envr	2	3
eosc	11	24
DE	0	2
TOTALS	**14**	**31**

In workshop & email.

level	*wksp*	*email*
1xx-2xx	2	5
3xx	3	8
4xx	6	7
5xx	3	9
DE	0	2
TOTALS	**14**	**31**

Types of deliverables, based on emailed data (33 courses, 36 items)

poster	9
writing	23
present'n	17
other	4

"Other" includes portfolio, multi-media, experimental, townhall, etc.

Types of work students do and some generic benefits of projects, from workshop discussions:

Types of student work:	Benefits of doing projects (not in any order):
• Solo vs groups (several varieties of group formation)	• Fun (motivation)
• Physical experimental	• Groups / teams
• Process real data (formatting, numerical, graphing, etc.)	• Authenticity (data, field, literature, real, community)
• Interpret real data sets	• Higher "level" than class & labs (apply, synthesis, create)
• Research, use, critique, synthesize scientific literature	• Ownership (motivation)
• Questioning & hypothesizing	• Application of theory
• Project definition, design, management	• Larger scale than assignments or labs
• Creative synthesis of learning (portfolios etc)	• Project management skills development
• Role play (eg. town hall meetings)	• Communication (written, poster, other)
• Peer review (work of other's)	• Engages instructor with students (two-way learning)

Evidently there is significant diversity. There is impressive commitment from our faculty to provide opportunities for high levels of learning and discovery. The next table provides a glimpse of challenges, some solutions or recommendations, and a few examples of courses that successfully manage these challenge. Some great work in our Department is missing from this list. We would like to augment this list. **Please contact STLFs with information that should be included.** ALSO – many strategies are well-researched in the Science Ed literature. Ask an STLF.

Ask a colleague (examples column), or contact an STLF for advice or to find colleagues who have experience.

Some challenges and a few ideas. NOTE this is a sampling. There is plenty of scope for collaboration, exchanging good ideas among courses, optimizing for efficiency and effectiveness, etc. Contact STLFs!	A few EOS examples (there are others)
Assessment • Most instructors use rubrics now. Maybe we should share a few! STLFs could generate a collection. • Creative projects can be judged by 'binning' projects, then assigning "qualitative" grade of 1-5 or 1-10.	• eosc110 (Grimm) • eosc212 (Jellinek)
Providing feedback • Focus time & energy on "preliminary" deliverables • Use peer review for feedback - possibly with calibration. See http://wiki.ubc.ca/Documentation:CPR	• eosc355 (C. Johnson multi-stage deliver-ables)
Peer assessment • Introduce low / medium / high quality examples, and have practice peer assessment sessions. • Rubrics need to balance simplicity with completeness.	• eosc472 (Orians) • eosc355 (C. Johnson) • eosc212 (Jellinek)
Group management • Actively assess (and self-assess) group / team work. • Consider using iPeer, see http://www.elearning.ubc.ca/toolkit/ipeer/ • Contracts – examples in a few EOS courses. Some references too (ask STLFs). • Groups in class are very different from out-of-class group work. Logistics at UBC can be **very** difficult. Therefore, "design" groups for class work but "self-select" SMALL groups (2-3) for external work. • Consider testing in groups – especially if that's how students practice their skills & knowledge.	• eosc321 (Scoates) • permanent in-class teams in eosc212, 355, 350 (Jellinik, Johnson, Oldenburg) • Loosely formed groups in many.
Timing and phasing of larger or more self-directed projects. • Students need structure. • Consider at least three stages: proposal, draft, final.	• eosc355 (C. Johnson) • eosc472 (Orians) • others? Tell an STLF!
Variable skill level, and implications for rigor / math • Use projects as an opportunity to focus on "softer skills" learning goals.	• Many face this challenge
Writing (additional ideas and thoughts are summarized in a separate document). • Point to Faculty of Science writing courses → scie113 (and scie300 for CMS students). • STLFs should find other references. • Refer to CPR; see http://wiki.ubc.ca/Documentation:CPR . • Add exercises involving analysis and critique of lo/med/hi quality examples (AGU abstracts?) • Introduce "writing throughout the program" for all students, involving 2nd, 3rd & 4th yr. courses. • eosc472 has a "home brewed" peer review process (K. Orians)	• eosc472 (Orians) • There is enough general interest in writing to revisit this topic in greater detail.
Fostering creativity • Explore creativity, portfolios, synthesis options (eg. K. Grimm) • Interesting perspectives – eg, observation as if you are a 19th cent. Naturalist	• eose314 (Jason McAlister)
Time consuming (instructors &/or TAs, &/or students) • Keep track of student workloads with survey. • Logistics of presentation need careful planning.	• eosc355 (C. Johnson)
Reduced coverage • Focus on goals and clarify what's really important. Content? Or mature, transferable skills?	• Eosc212 (Jellinek)
"Authenticity" (doing real things / using real data) • Experimental options (but don't duplicate lab work). • Use available data sets and reproduce classic results. • Consider persistent collection of a growing data set – eg. new lab course.	• eosc420 (Russell) • eosc450 (C. Johnson) • eosc442 (Ivanochko or Jordan Dawes)

NOTE this is not an exhaustive summary of projects in EOS. PLEASE tell us if your project or course is missing!

OR … drop in and let's have further conversations about writing, groups, feedback, assessment, goals … anything !