

More writing than instruction: Writing in a biology department

Writing in the STEAM Fields:
Science, Technology, Engineering, Arts & Math
University of Alberta, April 17, 2015
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Context for Study

- A large biology department with 2000 undergraduates
- Study conducted using syllabi and assignments from 2011-2012
- Analyzed 59 courses and 195 writing assignments

Research questions

- How many courses ask students to write?
- How many assignments are students asked to write?
- How do writing assignments vary
 - over the 4 year program?
 - between different course types (i.e., lecture only, lecture & lab, seminar, research, etc.)?

Research questions

- What types of writing are students assigned and what are the characteristics of the assignments?
 - Audiences?
 - Structure: linked/nested?
 - Formative feedback?
 - Plagiarism warning?
 - Style manual mentioned?
 - Rubric/scoring guide?
 - Examples?
 - Resources for assignment?
 - Length?
 - Time to complete?

Writing in Biology Assignment Analysis

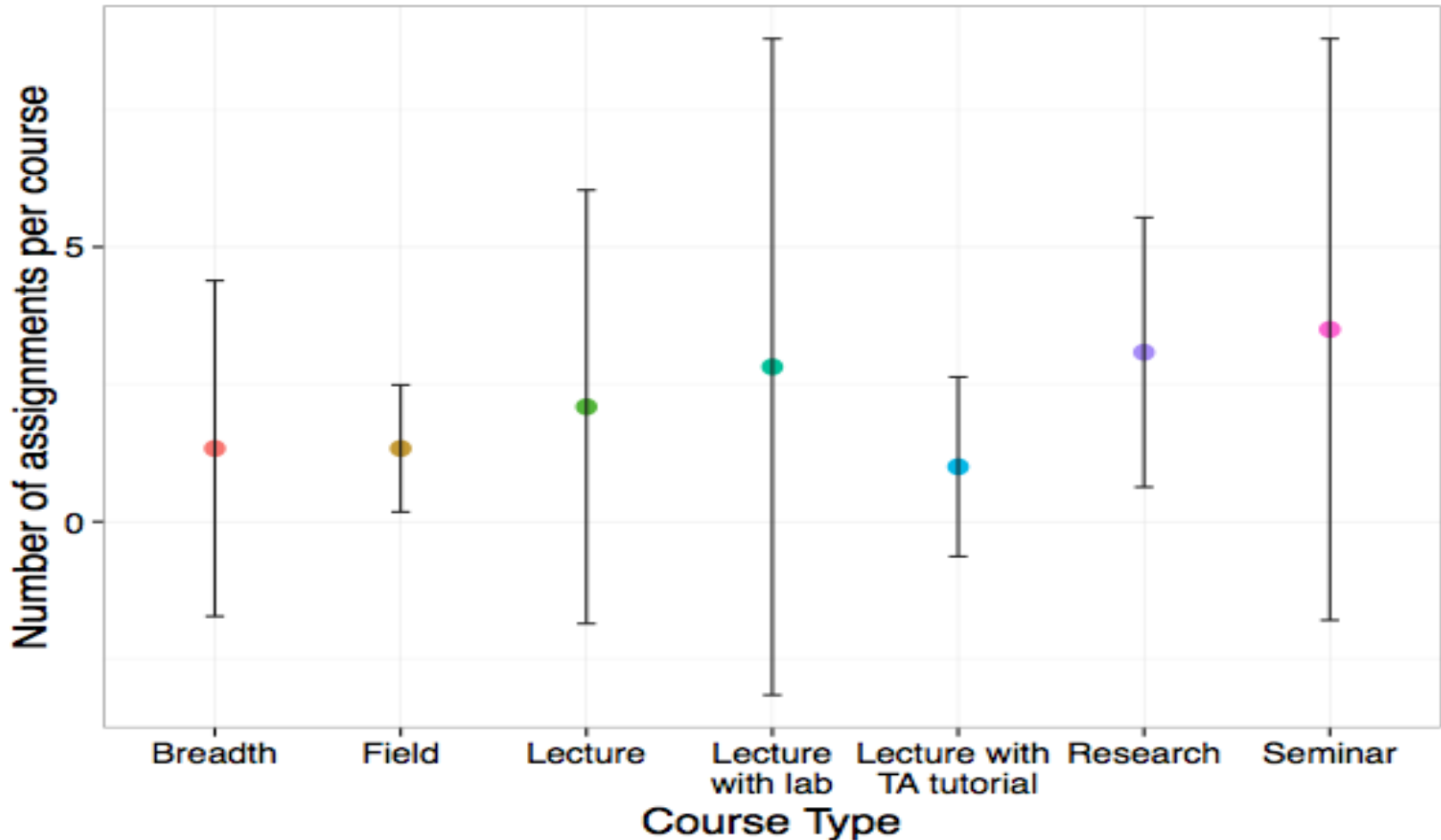
Analysis Overview

No. of courses analyzed	59
No. of all courses with writing assignments	47 (80%)

Total writing assignments and mean writing assignments per course by year

	Year 1	Year 2	Year 3	Year 4	Total
Total courses	3	14	25	17	59
Courses with writing	3 (100%)	9 (64%)	19 (76%)	16 (94%)	47 (80%)
Total writing assignments	8 (6%)	77 (39%)	63 (32%)	47 (24%)	195 (100%)
Writing assignments per course (mean \pm SD)	2.67 \pm 2.08	2.14 \pm 2.309	2.52 \pm 2.62	2.67 \pm 1.86	2.51 \pm 2.28

Average number of writing assignments by course type



Courses with writing, total writing assignments, and mean writing assignments per course, by course type.

Course type	Lecture	Lecture + Lab	Lecture+ TA Tutorial	Seminar	Field	Research	Breadth	Total
Total courses	11	22	4	4	3	12	3	59
Courses with writing	8 (73%)	15 (68%)	3 (75%)	4 (100%)	3 (100%)	12 (100%)	2 (67%)	47 (80%)
Total assignments	26	59	4	13	4	85	4	195
Writing assignments per course (mean \pm SD)	2.09 \pm 1.97	2.82 \pm 2.99	1.00 \pm 0.82	3.5 \pm 2.65	1.33 \pm 0.58	3.08 \pm 1.23	1.33 \pm 1.53	2.51 \pm 2.28

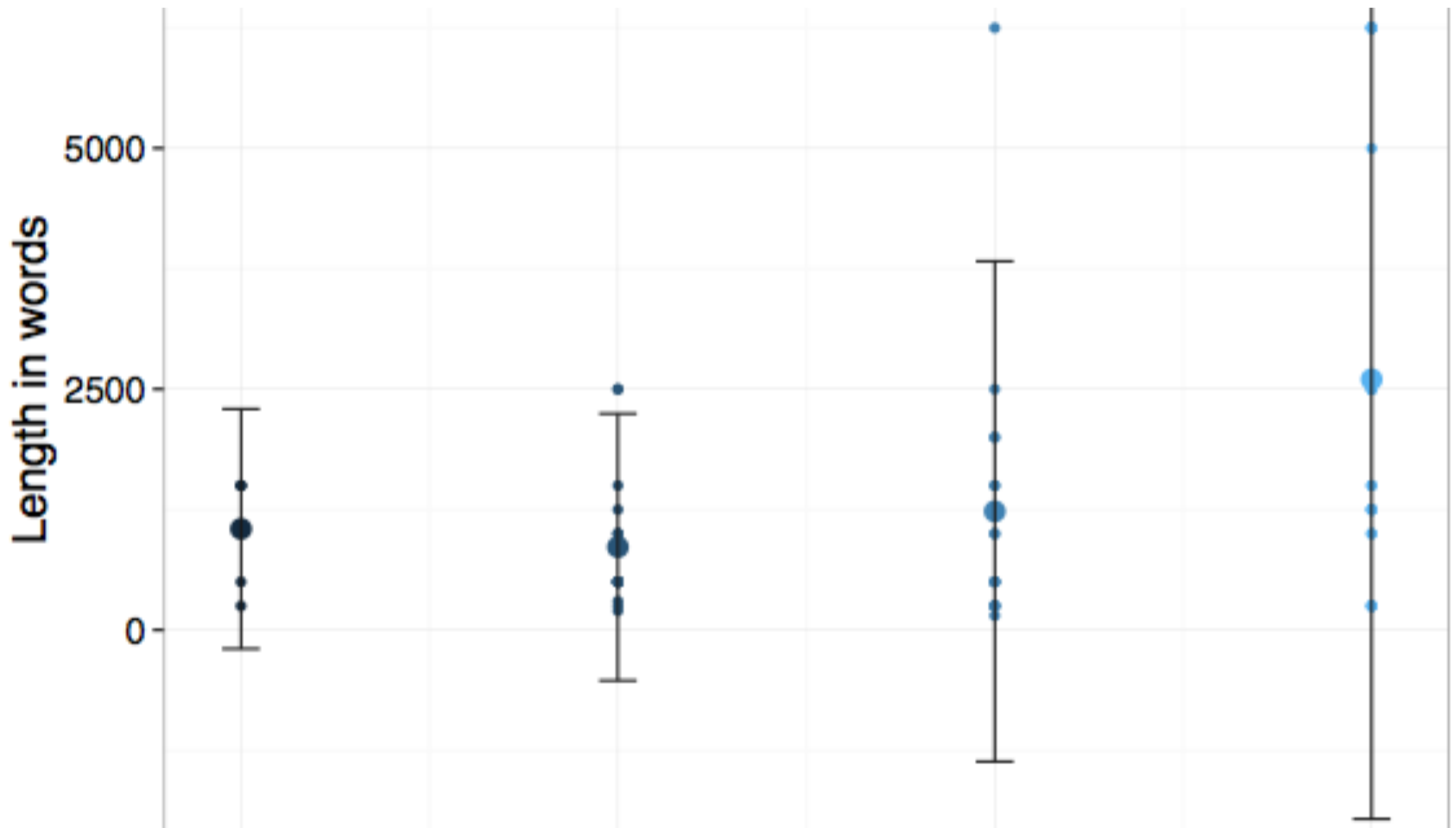
Top ten genres (instructor's name for assignment)

Genre	Number of assignments
Final report	14
Lab report	12
Proposal	8
Assignment	8
Paper critique	7
Written assignment	6
Discussion	6
Lab assignment	6
Scientific proposal	5
Short lab report	5

Top ten components (researchers' interpretations of assignment)

Genre	Number of assignments
Report	30
Assignment	25
Proposal	19
Poster	14
Presentation	14
Lab Report	13
Critique	12
Journal	9
Lab Notebook	6
Review	5

Assignment length in words, by year.



Assignment features that communicate expectations, by year

	Year 1	Year 2	Year 3	Year 4	Total
Total assignments	8	77	63	47	195
Percent mark value specified	8 (100%)	64 (83%)	61 (97%)	47 (100%)	180 (92%)
Length specified	5 (63%)	18 (23%)	22 (35%)	22 (47%)	67 (34%)
Time to complete specified	5 (63%)	60 (78%)	45 (71%)	33 (70%)	143 (73%)
Rubric/scoring guide	3 (38%)	6 (8%)	11 (17%)	2 (4%)	22 (11%)
Example	2 (38%)	1 (8%)	5 (17%)	6 (4%)	14 (7%)
References required or specified	4 (50%)	8 (10%)	17 (27%)	13 (28%)	42 (22%)
Style manual	4 (50%)	2 (3%)	14 (22%)	8 (17%)	28 (14%)
Plagiarism warning	6 (75%)	20 (26%)	41 (65%)	35 (74%)	102 (53%)

Assignment features that communicate instructor expectations, by course type.

	Course type							Total
Assignment Feature	Lecture	Lecture + Lab	Lecture+ TA Tutorial	Seminar	Field	Research	Breadth	
Total assignments	26	59	4	13	4	85	4	195
Percent mark value specified	24 (92%)	59 (100%)	4 (100%)	13 (100%)	4 (100%)	72 (85%)	4 (100%)	180 (92%)
Length specified	9 (35%)	25 (42%)	3 (75%)	7 (54%)	0 (0%)	23 (27%)	0 (0%)	67 (34%)
Time to complete specified	22 (%)	51 (%)	3 (%)	12 (%)	2 (%)	49 (%)	4 (100%)	143 (73%)
Rubric	1 (4%)	16 (27%)	2 (50%)	0	0	2 (2%)	1 (25%)	22 (11%)
Example	0	9 (15%)	0	4 (31%)	1 (25%)	0	0	14 (7%)
References required or specified	7 (27%)	19 (32%)	2 (50%)	3 (23%)	1 (25%)	9 (11%)	1 (25%)	42 (22%)
Style manual	6 (23%)	15 (25%)	0	2 (15%)	1 (25%)	4 (5%)	0	28 (14%)
Plagiarism warning	18 (69%)	58 (98%)	3 (75%)	11 (85%)	1 (25%)	8 (9%)	3 (75%)	102 (52%)

Assignment features that help students with writing tasks, by year

	Year 1	Year 2	Year 3	Year 4	Total
Total assignments	8	77	63	47	195
Formative feedback	2 (25%)	3 (4%)	1 (2%)	7 (15%)	13 (7%)
Nested assignments	5 (62%)	60 (78%)	33 (52%)	25 (53%)	123 (63%)
Suggested resources	7 (88%)	7 (9%)	27 (43%)	31 (66%)	72 (37%)
Learning goals stated	5 (63%)	18 (23%)	30 (48%)	29 (62%)	82 (42%)
Topic choice	1 (13%)	10 (13%)	14 (22%)	13 (28%)	38 (19%)

Assignment features that help students with writing tasks, by course type.

Course type	Lecture	Lecture + Lab	Lecture+ TA Tutorial	Seminar	Field	Research	Breadth	
Assignment Feature								
Formative feedback	0	2 (3%)	1 (25%)	1 (8%)	0	9 (11%)	0	13 (7%)
Nested assignments	9 (35%)	23 (40%)	0 (0%)	7 (54%)	0 (0%)	82 (96%)	2 (50%)	123 (63%)
Suggested resources	16 (62%)	31 (53%)	3 (75%)	11 (85%)	2 (50%)	9 (11%)	0	72 (37%)
Learning goals stated	14 (54%)	27 (46%)	2 (50%)	7 (54%)	1 (25%)	28 (33%)	3 (75%)	82 (42%)
Topic choice	4 (15%)	6 (10%)	2 (50%)	0	3 (75%)	20 (24%)	3 (75%)	38 (19%)
Total Writing Assignments	26	59	4	13	4	85	4	195

Assignment features that help students transition to the workplace, by year.

Total assignments	Year 1 (N=8)	Year 2 (N=77)	Year 3 (N=63)	Year 4 (N=47)	Total (N=195)
Academic Audience	8	77	63	47	195
Other audience	0	3	0	1	4
Group work (optional or required)	2 (0%)	5 (6%)	10 (16%)	1 (2%)	16 (8%)

Key Findings

Students in this biology department

- Write in 80% of all courses and on average 2.51 assignments a course
- Write significantly more in research and seminar courses
- Write a wide range of assignments but many of the same or similar types are called different names in different courses.
- Receive in-process feedback only 7% of the time, although the occurrence of this is likely higher due to research courses.
- Write almost exclusively for academic audiences
- Receive more warnings on assignments about plagiarism far more often than guidelines for using references
- Rarely get rubrics or sample assignments

After the Departmental Profile

1. Report submitted to Undergraduate coordinator with plans to present at spring faculty retreat.
2. Received ethics approval for alumni survey and faculty interviews.
3. Conducted alumni survey.
4. Using departmental profile for faculty interviews.
5. Planning to construct a curriculum map.

Alumni Survey Questions

1. Are you currently employed?
2. Please share any previous positions you have held that you think would be pertinent to our students.
3. Please share your LinkedIn profile.
- 4. Of the skills and knowledge you acquired through your degree, which have been most useful to you?**
- 5. What skills or knowledge would have better prepared you for your position?**
- 6. How could the program better prepare students for the workplace?**
7. Would you like to sign up for a listserv advertising relevant jobs?
8. Are you interested in speaking with program students at a mentorship or networking event?

Faculty Interview Questions

1. How do you come up with your assignments?
2. How much direction do you provide students?
3. What do you expect of undergraduate writing in biology? What are the elements of a good student paper and/or good student writing in biology?
4. Which assignments in biology courses do students typically do well in? Why?
5. Which assignments in biology courses do students typically do poorly in? Why?
6. What writing skills do students have when they enter biology programs?
7. What gaps do you notice?
8. What writing skills do you think undergraduates in the biology program should graduate with? Are current undergraduates developing these skills?

Faculty Interview Questions

9. Can you explain the differences between what you expect from a first-year and a fourth-year student's writing in biology?
10. Is there a difference in the writing assignments that you give to first year and fourth year writers? (length? Marks value? Research requirements?).
11. What problems do you face when teaching or responding to/evaluating writing in biology courses?
12. What challenges do students face when they write in biology courses?
13. What do you think of the data provided on writing assignments in biology? What surprises you? What does not surprise you?
14. What changes, if any, do you think the department as a whole could make to better help students develop as writers in biology?

Project Update and Next Steps

- 6 interviews faculty interviews completed so far
- Interviews to be transcribed and coded
- Aiming to an additional 6 at least with representative sample of faculty

Discussion Questions

- Roles of insider/outsider researchers?
- Role of inventory in curricular change?

Discussion Questions for Co-investigators

- How to condense the interview questions i.e., which, if any questions could be eliminated?
- Would 12 interviews be an appropriate sample size?