



Writing in the Sciences: Shifting the Current by Laying a Foundation for Student Success

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The Pearce Center Writing Fellows Program

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Background

- WAC—30+ years
- Endowed program—20+ years
 - Shift to faculty development emphasis
 - E-mail invite:
“Frustrated after reading a set of student papers?”



Pearce Center Writing Fellows Program

- Meet at least three times with the director for written communication (or another Pearce "partner") to discuss writing issues.
- Share with others how the fellowship has affected their teaching, on campus and/or at a regional/national/international conference.
- Stipend equal to one semester hour of an overload.

Role of the Pearce Partner

- Discuss the types of assignments appropriate for a particular course
- Explore the best way to incorporate those assignments in stages throughout the syllabus
- Help generate writing assignment sheets
- Visit classes to discuss the writing process
- Generate discipline-specific handouts on the writing process
- Assist in the design of grading rubrics
- Share in the grading experience



Master Fellows Program



- **Work with department colleagues**
 - to determine the kinds of writing their majors will need to master by graduation,
 - to examine the writing assignments currently being offered by the department, and
 - to chart a deliberate sequencing of assignments.
- **Share their WAC strategies at a regional or national conference.**



Third Fellowship Semester: Writing-in-the-Disciplines Web Site

- Program's writing goals
- Descriptions of kinds of assignments
- Guidelines for writing conventions within a particular discipline
- Sample papers with annotations
 - <http://columbiasc.edu/wid>

The Classroom Partners Initiative

Allan Nail, PhD

Associate Professor of English

Director, Academic Skills Center





Classroom Partners Initiative

Aid all students so that they can succeed in the writing classrooms—and beyond.

- Classroom Partners (CPs) are teamed up with an English 101 and 102 instructors.
- CPs model student excellence and professional behavior.
- English 101 students meet with CPs in the ASC for four (4) sessions.
- English 102 students meet with CPs in the ASC for three (3) sessions.

Maximize Productivity and Effectiveness

- English 101 and 102 instructors require students to meet with CPs during the drafting process.
- CPs aid students in understanding assignments, engaging the writing process, interpreting instructor feedback.
- CPs become familiar with classroom activities, lectures, and assignments, thereby reducing prep time during one-to-one tutoring.
- Instructors and CPs collaborate in creating guided checklists, handouts, and progress logs for students.

Creating a bridge between classroom and lab

- Research on the teaching of writing clarifies writing as a process of “semiotic work” (Kress 2003), more than a process of “finding” or “discovery” (Flowers & Hayes 1994).
- Writing is inherently *social* (Bleich 1989; Murray 1994), involving purpose, expression, participants, and context (Lindfors 1999); writing places the reader and the writer in each other’s roles *simultaneously* (Ivani 2004).
- CPs assist in creating extended classrooms as well as expanded processes, making both more visible and accessible.

Making the familiar strange

- Students see the product *and* the process.
- The text (paper) is a consequence of meaning-making (process).
- Meaning is created within particular contexts, with others.
- Writing is not generic.

Expansion beyond “writing” classrooms

- Merely knowing the facts of the subject is insufficient for writing about the subject– one must not only know how to participate within the discourse community but also actively identify as a member of a ‘socially meaningful group’ (Gee 1999)

Making the strange familiar

- Expansion of the CP program:
 - Literature
 - Journalism
 - Art history
 - Biology
 - Chemistry



Improving Lab Report Writing and Student Confidence Using Scaffolding Assignments and a Classroom Partner Program in Biology

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Assistant Professor of Biology

Pearce Fellow



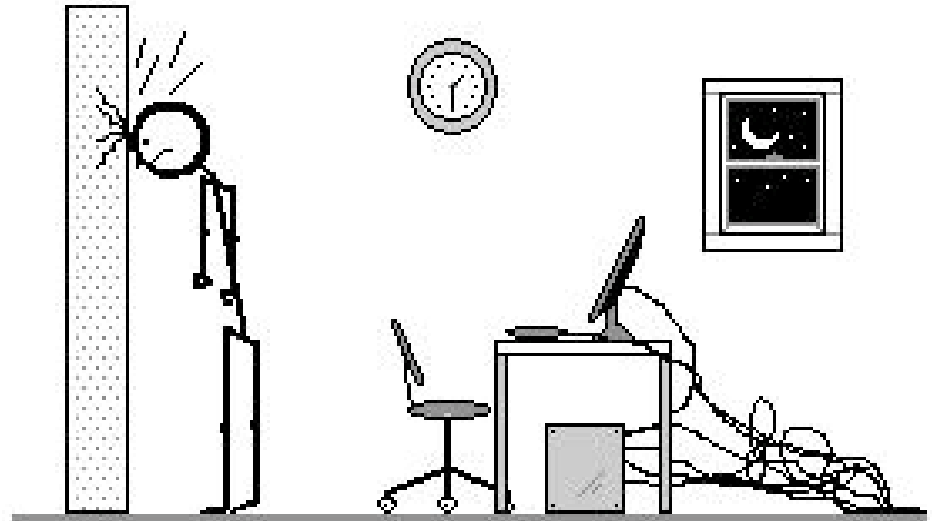
Back Story

- ◆ Students NEED to be able to write scientifically
 - Technical skill
- ◆ Understanding writing vs. understanding science
- ◆ Grading
- ◆ What I had been doing...



The Handout Method

- ◆ Helpful for some students
- ◆ Many students still below average
- ◆ Grading took ~30 minutes for a poorly written report
- ◆ Average 74 (n=36)





Plan of Attack for Bio 110

- ◆ Pearce Fellowship
- ◆ Handout and small groups
- ◆ **Scaffolding assignments** to break up the pieces of the lab report
- ◆ Require **Classroom Partner (CP)** meetings as part of the grade
- ◆ Be more **intentional** in **writing instruction** during lab
- ◆ **Inform** the students





Intentional Writing Instruction

- ◆ First day of lab
 - Introduce the idea of **focusing on writing**
 - Passed around **journal articles**
 - **CP** introduction
- ◆ Quickly reviewed some basic science writing conventions (Materials & Methods)
 - No first person
 - Past tense
 - If you start a sentence with a number, it should be written out.
 - ◆ Ex. Fifty mice were used ... Vs. 50 mice were used
- ◆ Simple Demonstration



<http://footage.shutterstock.com/clip-1170130-stock-footage-liquid-pours-into-an-out-of-focus-flask-in-the-background-with-an-empty-chemistry-beaker-and.html>

- ◆ "I added 50ml..."
- ◆ "Pick up the cylinder..."
- ◆ Needed more intentional instruction within lab



CP Role in My Biology Course

- ◆ An experienced science student
- ◆ Attends class/lab
- ◆ Gives feedback
 - Does NOT edit



<http://www.citvowinfo.com/images/education-news/college-students-who-use-twitter-earn-higher-grades-study-shows-10111502.jpg>



Scaffolding

- ◆ Freshmen in Intro Bio course
- ◆ Regular intervals, practice a section of lab report
- ◆ Two weeks to take draft to CP
 - Get feedback
 - Revise
 - Turn into me
 - I assign grade & feedback





Scaffolding

- ◆ Over 16 week semester with 14 labs
 - **Lab 1:** Introduce importance of focusing on writing
 - **Lab 2:** Focus on Materials and Methods
 - ◆ Students have two weeks to meet with CP and get feedback, revise and turn into me
 - **Lab 4:** Scaffolding 1 Due, Focus on Results and Discussions
 - ◆ Students have two weeks to meet with CP and get feedback, revise and turn into me
 - **Lab 6:** Scaffolding 2 Due, Lab Report Lab
 - ◆ Students have 5 weeks to meet with CP and me (2013) and get feedback, revise and turn in www.turnitin.com
 - **Lab 11:** Full Lab Report Due
 - ◆ Grade to give feedback before end of semester



Make it Count

◆ Lab Grade Policy:

■ Lab Assignments	20 points each	280
■ CP meetings	50 points each	150
◆ 1 for M&M		
◆ 1 for R&D		
◆ 1 for LR		
◆ 25 points from CP, 25 points for final product		
■ Lab report	100 points	<u>100</u>
■ TOTAL		530



Results

- ◆ Stronger writing over all
- ◆ Lab report average
 - 2012 (n= 43, Avg= 80)
 - 2013 (n=31, Avg= 91)
- ◆ Reduced grading time
- ◆ Greater student confidence





Select Student Survey Results

- ◆ Grumbled about it at first
 - 66.67% met with CP more than required 3 times
- ◆ "My collaboration with my CP has helped me improve my writing abilities."
 - Scale 0-5 (strongly agree):
 - 4: 49%; 5: 46%
- ◆ "As I complete my work in Bio 110, I think that getting peer (CP) feedback on my writing is important."
 - 4: 40%; 5: 55%



Select Student Survey Results

- ◆ When you first learned that you would be teamed up with a CP, what did you think?
 - "I thought that it would be just something that I was required to do that I would **not enjoy** whatsoever. I thought that it would be a **waste of my time.** "
 - "I did not understand the purpose because I didn't know that **science involved so much writing.**"
 - "I was **annoyed that it was required.** I thought I would be **fine without it.**"
 - "**Awesome,** I get extra help."



Select Student Survey Results

◆ After the CP experience:

- "I thought the classroom partner initiative is a **great idea** and very **beneficial** to students."
- "The CP sessions were **really helpful** and **should be required.**"
- "It was helpful to have a classroom partner that was **familiar with my class** and professor."
- "Yes, it showed me that **scientific writing isn't as hard as I thought.**"



Conclusions

- ◆ Want them better, we have to be better/smarter
- ◆ Clearly list all expectations
- ◆ Lots of communication among you, students and CP
- ◆ Give your feedback in timely fashion
- ◆ Find time is easy, finding money may be more difficult



Future for Writing in Biology

- ◆ Continue with CP & Scaffolding in Bio 110
 - Add more intentional writing instruction
 - Add more reading
- ◆ Implement more follow up in upper level courses
 - Myself
 - Other faculty
- ◆ Citations
 - Council of Science Editors
 - http://bcs.bedfordstmartins.com/resdoc5e/RES5e_ch11_o.html

Creating a Writing Intensive Chemistry Course through the Use of Scaffold Assignments and Classroom Partners Program

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Associate Professor of Chemistry

Pearce Fellow



History

- ◆ Curriculum revisions led to WI course requirement
 - General chemistry made sense as option

- ◆ Students seem to struggle with scientific writing
 - Third person, passive voice

- ◆ Students need to be able to differentiate between types of writing in chemistry
 - Laboratory notebook
 - Formal reports

- ◆ Grading



Plan of Attack for General Chemistry

- ◆ Pearce Fellowship
- ◆ Two semester sequence of courses
 - CHEM 121 – focus on laboratory notebook
 - CHEM 122 – transition to more formal writing
- ◆ Handout and class discussion
- ◆ Scaffolding assignments
- ◆ CP meetings are incorporated into the grade
- ◆ Students are presented with more intentional instruction through handouts and class discussion



Introduction to WI and CPs

- ◆ Writing Intensive concept is discussed in CHEM 121
 - Multiple references are made to the expectations and evolution of course writing assignments
- ◆ First CHEM 122 laboratory meeting
 - CP attends
 - Explanation of program and expectations
 - Handout with writing prompts
 - ◆ CP helps facilitate small group discussions
 - Goal is to make more intentional connections between laboratory sections



CP Role in CHEM 122

- ◆ One experienced science student
- ◆ Attends portions of the lab
- ◆ Gives feedback
 - Does NOT edit



Scaffolding

- ◆ The lab report is broken down into 5 separate assignments
 - Introduction
 - Purpose/procedure
 - Data/calculations
 - Discussion
 - Conclusions and references



Scaffolding

◆ From lab to CP to instructor

- Students have one week to meet with CP following lab experiment
- Get feedback, revise and submit to instructor
- Further feedback provided

◆ Formal lab reports

- 3 full reports towards end of semester
- First report
 - ◆ CP meeting
 - ◆ Instructor meeting
 - ◆ Revision
 - ◆ Submission of paper
 - ◆ Additional feedback
 - ◆ Revision



Scaffolding

◆ Over a full semester

- Week 1: introduction to laboratory reports
- Week 2: writing an introduction
- Week 3: writing purpose and procedures
- Week 4: writing/formatting data and calculations
- Week 5: writing discussion
- Week 6: writing conclusions and formatting references
- Week 7: full formal lab report
- Week 8: Conference with instructor
- Week 10: second full lab report
- Week 12: final full lab report



Student Accountability

- ◆ The lab component makes up 25% of overall course grade
 - 10% represents laboratory notebook (informal) writing
 - 15% represents formal laboratory reports

- ◆ Within lab portion
 - Lab notebooks: 50 points each
 - CP meetings/Scaffold Assignments: 50 points each
 - Formal lab reports: 100 points each



Results

	Spring 2013 Average (n=20)	Spring 2014 Average (n=18)
Formal Report 1	81.5	73.84
Formal Report 2	81.3	76.21
Formal Report 3	79.8	80.5

- ◆ First time around
 - Scores started off higher but decreased
- ◆ Second time around
 - Scores started lower but had significant improvement

Select Student Survey Results

◆ Did you complete your required classroom partner visits?

Spring 2013 (n = 21)	Spring 2014 (n = 16)
61.9%	93.8%

Select Student Survey Results

◆ My classroom partner has helped me to understand my writing abilities

	Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
Spring 2013	2	3	10	4	2
Spring 2014	1	11	4	0	0

Select Student Survey Results

- ◆ How has your work with your classroom partner shaped your ideas about writing?
 - “It has given me hope that maybe I’m not so terrible.”
 - “I realized I am a strong writer.”
 - “It always gives me more confidence in my lab writing.”
 - “It helped me structure and develop my labs.”



Future for Writing in Chemistry

- ◆ Writing in CHEM 122 will continue
 - Assignments will be modified to improve outcome
 - Even more feedback and revision opportunities
 - “flipped classroom” videos on writing and common mistakes

- ◆ Implementation in other chemistry courses
 - Help other faculty create intentional assignments and rubrics



Factors to Consider for Science CPs

- ◆ Identifying qualified science majors
- ◆ Train them
 - Review writing skills
 - Attend your labs
- ◆ Pay them





Science Curriculum Writing Initiatives

◆ What we've done

- Frank conversations with colleagues
- Mapped out where writing is taking place

◆ What we hope to do

- Give students consistent messages
- Encourage colleagues to use scaffolding and rubrics
- 1 credit hour science seminar course on writing



Acknowledgements

- ◆ Pearce Fellowship
- ◆ Co-presenters
- ◆ CPs: Linda McClain and Nikki Atencio
- ◆ Division of Languages and Literatures
- ◆ Division of Business, Mathematics and Sciences at Columbia College