

Oral Presentation 0237

An Integrated Scientific Writing Course Supports Graduate Student Success in Research Publication

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Assumptions:

Graduate students are expected to publish their research outcomes in peer-reviewed scientific journals.

As educators and mentors we have a responsibility to support the attainment of the outcomes we expect of our students.

It is also our responsibility to communicate to the scientific community the results of our professional practice.



However,

- We tend not to be gifted-writers
- Most students are not well prepared to write a scientific paper
- They may be anxious about it -- often 2X anxiety for non-native English speakers
- Fear of the unknown is a factor—submission to a peer-reviewed journal for the first time can seem like a daunting challenge
- Few students have received prior instruction on the mechanics and psychology of manuscript preparation

Daunting Challenge



From: mountainsoftravelphotos.com

On reflection:

- Most of us had a “learn by doing” experience on the front-end of our careers
- What was our opportunity for learning to become a better writer?
- What was our opportunity for leading the process and internalizing the skills necessary for a successful career?

Is there a better way to learn how to write a scientific manuscript than through the “School of Hard Knocks?”



Phase 1. Providing support:

Perhaps design a course where students can learn techniques for preparing scientific journal articles

Brainstorming:

Planning and preparation of a course offering through both planned and informal dialogue on the way forward—including faculty and student conversations, interviews, and group discussions

- What should students get out of the course?
- Graduate level only or bi-level?
- Class format?
- Co-instructors?
- Cross-departmental?
- Course content and materials?

Implementation of graduate level course:

Co-instructors utilized an instructional *process* developed at Iowa State University that requires students to create a complete manuscript organized around core *“take home messages.”*

An Excellent “how to” book:

Getting Published in the Life Sciences, [Richard J. Gladon](#), [William R. Graves](#), [J. Michael Kelly](#). ISBN: 978-1-118-01716-6, 368 pages, August 2011, Wiley-Blackwell.

<http://www.wiley.com/WileyCDA/WileyTitle/productCd-1118017161.html>

Gladon et al:

- Conduct sound research, analyze the data, determine what story you can tell
- Tell it by determining what your take-home messages are—then write the supporting evidence in a systematic way, step-by-step

(In a manner that fulfills the journal requirements for organization and presentation of the story.)



Phase 2. Address the psychology of student anxiety around the task of writing a paper:

How to Write a Lot: A Practical Guide to Productive Academic Writing (Paperback) January 15, 2007 by [Paul J. Silvia](#) (Author)
ISBN-13: 978-1591477433 ISBN-10: 1591477433 Edition: 1st.
<http://www.youtube.com/watch?v=DeVjXINr5Wk>

And concomitantly: English as a Second Language (ESL) needs:

Optional text: Science Research Writing for Non-Native Speakers of English by Hilary Glasman-Deal. ISBN-13: 978-1848163102 ISBN-10: 184816310X Edition: 1st Imperial College Press



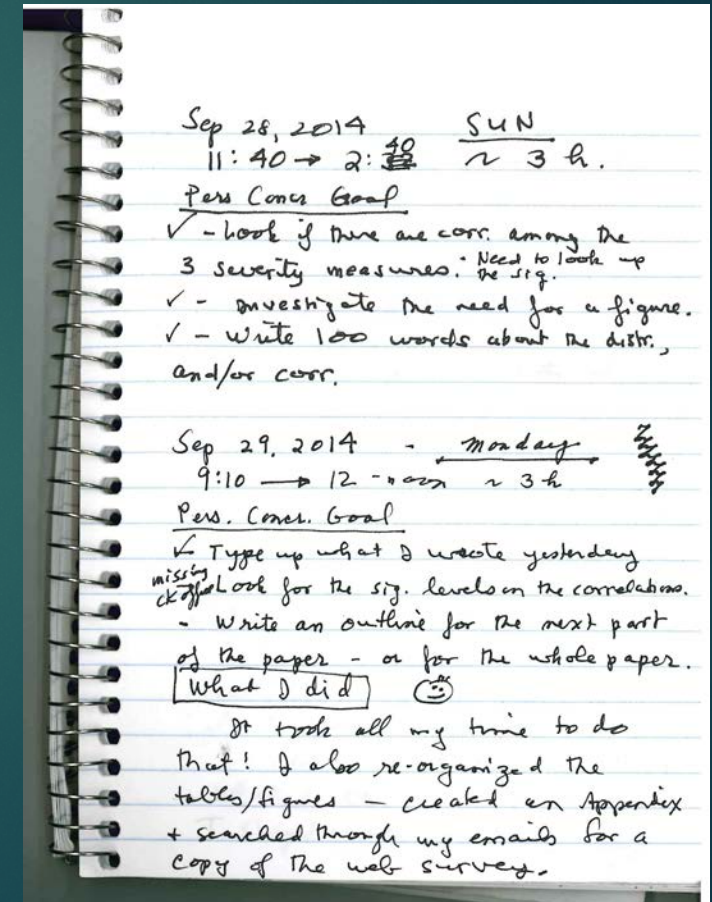
Silvia:

- Overcome writing barriers by implementing a goal-oriented writing schedule
- Reward yourself when you accomplish goals and achieve the milestones you set for yourself

Methods:

- Start with a brief writing assignment (educational biography)
- Read and complete assignments in Gladon et al
- Read and practice goal-setting and keep a writing diary (Silvia)

Dr. Regnier's daily goals

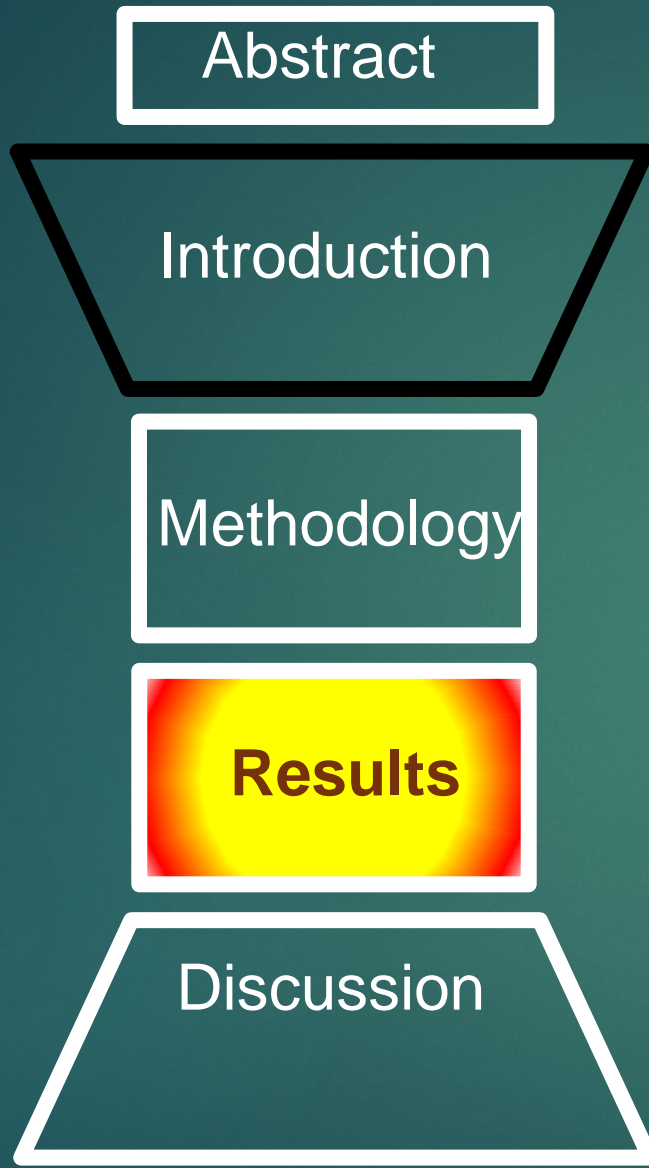


Examples of Concrete Goals:

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- ▶ Write at least 200 words
- ▶ Print the draft I finished yesterday, read & revise it
- ▶ Make a new list of project goals and write them down
- ▶ Brainstorm and then outline a new manuscript
- ▶ Write the first 3 paragraphs of the discussion
- ▶ Correct the page proofs and mail them back
- ▶ Add missing references and then reconcile the citations and references

- Powerpoint presentations reinforce and augment the texts – provide “tips of the trade,” convey concepts, personal experiences etc.
- Experiential learning accomplished by in-class peer review of short writing assignments as well as of the complete manuscript



Powerpoint slide to convey a concept:

The results section is the “heart” or the “core” of the manuscript—what are its characteristics?

Integrates elements of all three texts

What you found or saw

Sufficient data *and no more*

Short, “crisp” simple sentences

Characteristics of the Results Section

Assessment:

- Anonymous questionnaires enabled measurement of improvements in student confidence and ability
- Mid-semester instructor-student meetings were valuable
- Comparisons of “earlier” vs. “later” writing samples
- Quizzes and exams a lesser component in grading
- Grading of full manuscript after “first-round” review
- Student evaluation of instruction instruments

Outcomes:

Measurable, positive impacts on student writing -

Students became 17% to 55% more confident in their ability to take a lead role in writing a high quality peer-reviewed, scientific journal article

Successful submission and acceptance of manuscripts

Phase 3. New directions:

- Elevate attention to the peer-review process
- Spend more time on the ethics of publishing
- Reduce the amount of “power-point time” and introduce more writing activities
- Ongoing dilemma – how to help build grammar skills without making the course an English class



Develop more early-semester assignments:

Students write a report on something widely known (e.g., how to make a sandwich) and then write about something widely unknown (e.g., how to design an electronic fuel injector).

Suggestions (and questions) are most welcome!