

Teaching reviewing to graduate students

Jens Palsberg
Purdue University
Dept. of Computer Science
palsberg@cs.purdue.edu

Scott J. Baxter
Purdue University
Dept. of English
baxters@purdue.edu

June 7, 2002

Abstract

A report on how a computer science professor and a Ph.D. student in English turned a graduate seminar into a vehicle for teaching reviewing to graduate students. The evaluation and conclusions may help others do likewise.

1 Introduction

The computer science research community depends on qualified peer review. For example, when an editor or a program committee decides whether to accept or reject a paper, the decision is often based on a number of reviews. Moreover, an author who receives reviews of a submission may use the reviews as a basis for revising the paper. And while graduate students are not usually asked to write reviews, they will be expected to write them once they finish their Ph.D.s and enter the computer science community. For these reasons, it is important that new Ph.D. graduates be capable of writing useful reviews.

A number of articles describe good principles and practices of reviewing, including Ian Parberry's Referee's Guide [6]. However, researchers usually need to find and study such guides on their own and to learn reviewing with little to no practical training because training in reviewing is generally not a part of a Ph.D. education. Despite this fact, we believe that the teaching of reviewing should be part of a Ph.D. education, and that such training can be integrated smoothly and inexpensively as part of existing coursework rather than be added as an additional course.

In this paper we present the design of a graduate course in which the teaching of reviewing was an integral part. We also describe our experience with teaching such a course in Fall 2001. We believe that our model could be successful in a variety of other contexts.

2 The Course

In Fall 2001, we taught the graduate course "Formal Compiling Methods" at Purdue University, Department of Computer Science. The course was a seminar course in which 22 papers were presented. There were two papers from 1998, two from 1999, ten from 2000 and eight from 2001. All but four of the papers were taken from conference proceedings; thus, they might be revised, expanded, and submitted to a journal. Each student presented one paper. The student was given 40 minutes to give a summary and evaluation of the paper. Then he/she was expected to answer questions and lead a discussion for the remainder of the 75 minute period. In addition to the student presentations, four of the authors of the papers visited Purdue and presented their papers.

Each week every student wrote a review of a paper, for a total of eleven reviews. The students were asked to write the reviews in the style of a review of a submission to ACM Transactions on Programming Languages and Systems (TOPLAS). A relaxation of this standard was that the students were not required to check any mathematical proofs, although they were asked to make a judgment of whether the proofs were clear, convincing, and elegant. ACM TOPLAS was chosen as the model for review writing because of its reputation as a top journal within the computer science community. The primary purpose of having the students write reviews of the papers was to ensure that they read the papers thoroughly. However, a secondary purpose was to initiate students into the process of review writing. At the beginning of the course, Palsberg gave an introduction to reviewing, and Baxter gave an introduction to public speaking. Palsberg also distributed copies of three recent reviews he had written for ACM TOPLAS submissions. While it was not implied that those three reviews were the "gold standard" for reviews, they served as useful models from which the students could infer what a journal

review looks like. It is questionable to distribute reviews that have been written in confidence, but we could not think of a better way of providing realistic examples. The reviews were distributed in hardcopy and the students were urged to treat them with the utmost discretion. We hope that better solutions can be found in the future.

The students had to submit their reviews in LaTeX with a required style file and in postscript. For a few of the students, this was their initiation to LaTeX, an easy hurdle to overcome, as it turned out. Every week, the students would send Baxter a draft of their review, and then he would read their papers, mark them, and give the students feedback in one-on-one conferences. The primary purpose of these conferences was for Baxter to try to help the students say what they wanted to say as clearly as was possible, although a secondary purpose was to eliminate grammatical errors. After that, the students could use Baxter's feedback in revising their reviews before sending them to Palsberg, who would then give them comments on the technical aspects of their reviews. Because Baxter looked at the reviews before they were sent to Palsberg, Palsberg saved a great deal of time that might have been spent worrying about grammatical errors and rhetorical problems. The division of labor meant that little communication between Baxter and Palsberg was necessary during the course and that each of them could concentrate on their area of expertise.

At the end of the semester, we had a mock program-committee meeting. During this meeting we selected from the papers presented in the course the ones we believed were the best. And, then, during the final exam week, each of the students wrote a summary review of one of those top papers in the style of the reviews found in ACM Computing Reviews. This program-committee meeting and subsequent review turned out to be an effective way to push the students to try and write even stronger reviews than the ones they had written earlier in the course.

3 The Students

There were 17 students in the course: four from P.R. China, four from U.S.A., two from India, two from Rumania, and one from each of Bulgaria, Germany, Japan, Poland, and Russia. All of them were from the Computer Science Department. As can be seen, most of the students were non-native speakers of English, primarily from Asia and Europe. The students all had substantial previous course experience in the topic area of the seminar course, in particular, all of

them had written a compiler, and nearly every student was able to read at least one paper that was directly related to his/her research interests. Nine of the students were Ph.D. students who had completed their qualifying exams and had published one or more papers. Among the remaining eight students, one was an undergraduate student with unusually good credentials, and seven were first or second year graduate students. We had a limit on the number of students who could register for the course in order to avoid drowning in reviews.

4 Our Qualifications

Palsberg was the professor and Baxter was the teaching assistant. Over the past decade, Palsberg has written more than 1200 reviews of journal submissions, research proposals, conference submissions, books, book proposals, Ph.D. and M.A. theses, and other academic genres. In addition, he is a former associate editor of IEEE Transactions on Software Engineering. In a somewhat unusual move, the teaching assistant, Baxter, was chosen from the English Department, rather than from the Computer Science Department. The reason for this move was that Palsberg wanted to find a person with expertise in writing. It so happens that Purdue's English department offers a Ph.D. in both composition studies and in teaching English as a second language with a number of graduate students who have expertise in second language writing, including Baxter. Given the fact that writing in a second language is quite different than writing in a first language [7] it seemed important to find a teaching assistant who had expertise in academic writing in a second language in order to make the tutoring more effective [5].

5 Evaluation Of The Course

Writing reviews of papers cannot compare with actually writing a compiler, or doing theoretical exercises on variations of the material. However, writing reviews was the only homework in the course; and we are happy to report that the students took the opportunity to study the material in considerable depth. We are also happy to report that we saw definite improvement in the quality of reviews as the course progressed. Below we outline four episodes that we believe illustrate this improvement.

Episode 1: At the beginning of the course students struggled with how to position themselves in their reviews. However, they quickly learned the importance

of trying to project their credibility in their reviews. As one of our colleagues told one of the students, "if you think you were rejected by a graduate student that is upsetting, but if the reviewer comes across as a knowledgeable expert, then rejection is more tolerable." While it can be challenging for a novice to judge whether the ideas and the techniques in a paper are new, important, and difficult, the students increasingly learned to rely on what they already know.

Episode 2: Another problem that came up early in the semester was that a number of students began to tell Palsberg that they thought the paper was excellent and that there was nothing to criticize in the paper. Palsberg solved this problem by sending an email to the class pointing out to the students that there is always something a paper can be criticized for, whether it be a lack of scientific motivation, a lack of industry motivation, problems with the proofs, problems with the language, or any number of other potential problems. At this point in the course, Baxter began pushing the students to think about how the review might be useful to both the editor and the author. He reminded the students that scientists typically read to find what is most relevant to their particular research agenda [2], and that a review with no criticism does not help an author or an editor pursue that research agenda.

Episode 3: Palsberg graded all the reviews himself (Baxter did not do any grading), and the grades were weighted so that those reviews written in the second half of the semester were both worth more and were graded more harshly. The students were recommended to ensure that their reviews be more than merely summaries, and that criticism should be phrased in terms of specific sections or paragraphs of a paper. In the second half of the semester Palsberg began to look at two things which he felt were not always done as well as they should have been in the first half of the semester: 1) whether the review had both a thoughtfully written section that discussed the value of the paper as well as a useful list of suggestions for improvement, and 2) whether there was a clear relationship between the body of the review and the overall recommendation (accept, reject, etc.). Baxter began to focus the conferences on these issues by alerting students to specific parts in their reviews where they could highlight these points.

Episode 4: A welcome side effect of the course was the transfer of writing skills; by improving their ability to write reviews, students also improved their ability to write and reflect on their own papers. An ex-

ample will help to illustrate our point. One of the students was writing a paper for his qualification exam at the same time he was taking our course. He wrote a first draft before the semester started and his advisor told us that he had to suggest a rewrite of a substantial portion. This student submitted a later version of his qualifier paper and defended it while taking our course. His advisor told us he was amazed at the dramatic improvement he saw and said that the writing on the final version of the qualifier paper was almost as good as what he could have written himself.

The students ultimately gained confidence in several areas which allowed them to write better and more useful reviews. They gained confidence in their ability to read and understand the technical papers presented in the course; they gained confidence in their knowledge of how reviews should be structured, written, and used; and they gained confidence in their technical writing abilities. During the course, the students gave, on average, steadily lower rankings to the reviewed papers. Confidence is certainly not a sufficient condition for improvement in review writing skills, but we believe it is a necessary one.

6 Conclusion

In this article we have described a graduate seminar in which one of the purposes of the course was to improve the reviewing skills of the students. For those who may be considering offering a similar course at their institution we would like to suggest some guidelines that they may want to consider.

We spent a considerable amount of time planning the course, although once the semester started this course took no more time to teach and prepare for than any other graduate course normally does. There was a great amount of time and a good many emails devoted to deciding when reviews should be due, how much time Baxter would need to read them, what the format of the reviews should be, as well as many other details. But probably the most important element in the planning was the initial phone call to Purdue's director of composition. The director of composition was able to identify an appropriate candidate and helped Palsberg set up the initial meeting with Baxter.

Because of the large number of reviews that students wrote, it would have been a daunting task to teach such a course without a teaching assistant. In an ideal world, the teaching assistant for the course would have been a person from the Computer Science Department who had expertise in teaching writing.

However, at least at our institution, no such person existed. But because Baxter worked with the same students throughout the semester he became well acquainted with the discourse of computer science. If Palsberg had not hired Baxter, and, instead, sent all of the students to Purdue's writing center for comments on their reviews, then the reviews probably would not have been written as well as they were.

There is one last suggestion we would like to note. Because most of the students in this course were non-native speakers of English, it was helpful to hire a teaching assistant who was a second-language writing specialist. However, if such a person cannot be found, a person experienced in the teaching and tutoring of writing would be second best. As we said earlier, a call to the director of composition or the director of the writing center would probably be the best place to start in identifying a suitable candidate.

We were quite pleased with the results of the course, although we recognize that there may also be other ways to structure a writing intensive course [1, 3, 4, 8]. We leave it to others to use informed judgment in the light of local circumstances to determine what things found in this article might be most useful to them as they plan and execute their own courses. The course website is at www.cs.purdue.edu/homes/palsberg/cs661/F01.

Acknowledgments: Palsberg thanks Frank Anger (National Science Foundation), Douglas Comer (Purdue University), Norman Ramsey (Harvard University), Paul Reynolds (University of Virginia), and Gene Spafford (Purdue University) for helpful discussions and advice during the planning of the course. Palsberg also thanks Tony Hosking, Zhiyuan Li, and Jan Vitek (all of Purdue University) for encouragement along way. Finally, Palsberg thanks his department head, Ahmed Sameh, for the financial support to hire a teaching assistant from the Department of English.

Baxter thanks Irwin Weiser (Purdue University) for setting up the initial contact with Palsberg. He is also grateful to Diane Belcher (Ohio State University), Linda Bergmann (Purdue University), Avon Crismore (Indiana/Purdue University, Fort Wayne), Christine Feak (University of Michigan), Susan Reinhart (University of Michigan), Peter Master (San Jose State University), and John Swales (University of Michigan), for helpful advice and suggestions during the planning phase of the course. In addition, he is also grateful to Tony Silva and Graham Smart (both of Purdue University) for their insightful comments on an earlier version of this paper.

References

- [1] C. M. Anson. *The WAC Casebook: Scenes for Faculty Reflection and Program Development*. Oxford University Press, 2002.
- [2] C. Bazerman. Physicists reading physics: Schema-laden purposes and purpose-laden schema. *Written Communication*, 2:3–24, 1985.
- [3] J. C. Bean. *Engaging Ideas: The Professor's Guide to Integrating Writing, Critical Thinking, and Active Learning in the Classroom*. Jossey-Bass, San Francisco, 1996.
- [4] T. Dudley-Evans. Team-teaching in EAP: Changes and adaptations in the Birmingham approach. In J. J. Flowerdew and M. Peacock, editors, *Research Perspectives on English for Academic Purposes*, pages 225–238. Cambridge University Press, 2001.
- [5] M. Harris and T. Silva. Tutoring ESL students: Issues and options. *College Composition and Communication*, 44(4):525–537, 1993.
- [6] Ian Parberry. A guide for new referees in theoretical computer science. *Information and Computation*, 112(1):96–116, 1994.
- [7] T. Silva. Toward an understanding of the distinct nature of second language writing: The ESL research and its implications. *TESOL Quarterly*, 27(4):657–677, 1993.
- [8] M. A. Townsend. Writing intensive courses and WAC. In S. H. McLeod, E. Miraglia, M. Soven, and C. Thaiss, editors, *WAC for the New Millennium: Strategies for Continuing Writing Across the Curriculum Programs*, pages 233–258. National Council of Teachers of English, Urbana, Illinois, 2001.