

## INSTRUCTIONAL DESIGN AND ASSESSMENT

### Creation of a Graduate Oral/Written Communication Skills Course

Christopher K. Surratt, PhD

Mylan School of Pharmacy, Duquesne University

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**Objective.** To convert a traditional graduate seminar course into a class that emphasizes written as well as oral communication skills.

**Design.** Graduate pharmacology/toxicology students presented formal and informal seminars on their research progress and on recent peer-reviewed literature from the field. Students in the audience wrote critiques of the research project or article, as well as of the presentations themselves.

**Assessment.** Students were evaluated based on oral presentations, class participation, and a scientific writing component. All faculty members provided constructive written comments and a grade. The course master provided the presenter with a formal written review and returned a “red pen” revision of each student critique.

**Conclusion.** This novel seminar/writing course introduces intensive focus on writing skills, which are especially essential today given the large number of graduate students for whom English is not a first language.

**Keywords:** research, seminar, communication skills, graduate education

## INTRODUCTION

There are 3 compelling reasons for a pharmacy school to insist that its graduate students acquire excellent oral and written communication skills before receiving the MS or PhD degree: to ensure that doctor of pharmacy (PharmD) student training by these teaching assistants is of the highest quality, to fully prepare the graduate student for employment, and to enrich the pool of future pharmacy faculty candidates. The PharmD student training issue is initially most pressing because graduate students typically assume teaching assistant responsibilities soon after matriculation. A first-year graduate student rarely has adequate communication skills, let alone teaching experience. The problem appears to be compounded at research-oriented pharmacy schools, where many of the graduate students claim English as a second language. Indeed, there is evidence that the academic performance of undergraduates may be compromised by foreign-born teaching assistants.<sup>1</sup> Enhancing the communication skills of graduate teaching assistants should in turn improve PharmD education quality.<sup>2</sup> The PharmD student must acquire these same skills to achieve the level of professionalism necessary in a successful pharmacist.<sup>3</sup>

In the experience of the author, the first-year pharmacy graduate student typically possesses at best mediocre oral presentation skills, and perhaps worse writing skills. This problem is likely to be more apparent in those students with an undergraduate pharmacy degree, considering that 4 or 5 years may intervene between the last formal writing course and graduation. Whatever the reason for the deficiencies, the oral and written communication skills of first year Duquesne University School of Pharmacy (DUSOP) graduate students are suboptimal, and the basic English writing skills of the international students are often in desperate need of remediation. The more glaring writing problems include incomplete or “run-on” sentences and improper punctuation, word choice, and verb conjugation. The prose is often of a stream-of-consciousness style, without organization. Obtaining formal presentation and writing skills could be the most important aspect of graduate student education, as students must learn to speak effectively in departmental seminars as well as at national meetings and in interviews. They must learn how to write effectively not only for the sake of a course, but for their thesis, manuscripts, and future grant applications or annual reports. They cannot compete in industry, government, or academic settings without these skills. Indeed, when asked which qualities were most important for obtaining employment, graduate business students in one study ranked “communication skills” first, above “graduate qualities”

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**Corresponding Author:** Christopher K. Surratt, PhD, Duquesne University, Mellon Hall, Room 453, 600 Forbes Avenue, Pittsburgh, PA 15282. Tel: 412-396-5007. Fax: 412-396-4660. E-mail: [surratt@duq.edu](mailto:surratt@duq.edu)

identified by the senior management of the school that included “problem solving,” “ability to work collaboratively,” and “body of knowledge.”<sup>4</sup>

Like many American pharmacy schools, the DUSOP has found it difficult in recent years to find suitable candidates to fill faculty vacancies. This emerging problem in academic pharmacy has been noted previously<sup>5,6</sup> and is addressed by “Goal I” of the latest AACP Strategic Plan.<sup>7</sup> Given that research grant-driven non-pharmacy schools receive hundreds of applications for a single faculty position opening and tuition-driven pharmacy schools receive far less, the dearth of qualified faculty candidates appears to be more pronounced for the latter, which may be due in part to their emphasis on teaching. The oral communication skills of a successful teacher must be excellent. In contrast, many grant-supported research faculty members make little or no didactic contribution to their department and require only enough skill to orally communicate their findings to small groups. Some of the same research faculty members are assigned writing assistants for manuscripts and grant applications, and thus survive without developing excellent writing skills. The pharmacy school thus faces a special challenge in finding a potentially excellent teacher-scholar. One strategy for increasing the odds of finding faculty candidates with excellent oral and written communication skills is to develop these individuals at the “pre-candidate” stage, by properly training pharmacy graduate students in these skills.

Undergraduate pharmacy courses are effective in enhancing oral and written communication skills,<sup>8-10</sup> a fact even acknowledged by recently graduated pharmacists.<sup>11</sup> Unfortunately, a typical graduate pharmacy program may only require the student to present a seminar to the department once or twice a year. There is no training in formal writing unless the mentor requires and provides critique of research progress reports.<sup>12</sup> The first formal writing required of the student may be a manuscript or the thesis, 3-5 years into the program. Such was the case for the DUSOP pharmacology/toxicology department until recently, when the traditional graduate seminar course was converted to the oral/written communication skills courses described herein. These new courses focus on enhancing speaking skills, employing videotaping of the seminar as a means of self-assessment. The courses require that the graduate student submit formal written critiques of each weekly seminar for grading, from the first week of graduate school until the thesis defense. In the process, the student learns not only formal writing skills, but how to comprehend and evaluate both the scientific literature and the research of his/her peers—important skills for an academic career. These novel courses signif-

icantly enhance the oral and written communication skills of DUSOP pharmacology/toxicology graduate students, and could serve as a template for other pharmacy graduate schools.

## **DESIGN**

### **Expected Outcomes**

DUSOP pharmacology/toxicology graduate students are expected to comprehend their research project or a relevant peer-reviewed article from the scientific literature and present the research in a form that allows those new to the field (their peers) to comprehend, analyze, and evaluate the work. Students are expected to write formal critiques of the research presented as well as the presentation itself, demonstrating comprehension of the presentation while providing their own analysis and interpretation of the findings. The process is expected to develop oral and written communication skills to the point that the student can professionally present a seminar at a thesis defense, national scientific meeting, or job interview, and can submit a professionally written document for a thesis defense or for publication or funding. Expected outcomes are given in Tables 1 and 2.

### **Educational Environment**

The pharmacology/toxicology department is a component of the Division of Pharmaceutical Sciences of the DUSOP. Its faculty consists of 5 members with primary appointments and 1 with a secondary appointment. Primary members are expected to attend the weekly seminar portion of the 2 oral/written communication skills courses. The number of MS and PhD pharmacology/toxicology graduate students and PharmD research-track students<sup>13</sup> ranges from 12-17 from year to year. The spring 2005 course contained 15 students, one of which was a PharmD student. Of the 15, 8 were American, 3 were Indian, 2 were Chinese, and 2 were Nigerian. All of the foreign students held a student visa. All graduate students are required to complete these courses each semester for as long as they are in a degree program (the student cannot “place out” of the course).

### **Oral Presentation Component**

**“Work in Progress” Seminar.** *Graduate Pharmaceutical Sciences*, GPHSC 693, the fall semester DUSOP graduate pharmacology/toxicology seminar course, was renamed *Oral/Written Communication Skills in Pharmacology/Toxicology I* as a result of the course revision described herein. The course requires each student to deliver, in formal dress, one formal *PowerPoint* presentation that updates the Department on his/her thesis research progress during the last year. In the case of

Table 1. Criteria for Grading Oral Presentations

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| Delivery   |
| <ul style="list-style-type: none"><li>• Was the speaker poised and smooth in delivery? When interrupted, could the speaker resume the presentation without difficulty?</li><li>• Was the pace appropriate? Did the presenter speak too rapidly to be understood?</li><li>• Was the speaker articulate, and were words properly enunciated?</li><li>• Did the speaker project his/her voice, make regular eye contact with the audience, and connote confidence via body language?</li><li>• Was the time allowed to read and comprehend the slide sufficient? Were the text slides paraphrased or read verbatim?</li></ul>   |
| Quality of slides/transparencies   |
| <ul style="list-style-type: none"><li>• Were the schematic diagrams understandable to the lay scientist?</li><li>• Were the figures and tables of appropriate size, sharpness and color? Were they properly annotated?</li><li>• Was too much information presented per slide?</li></ul>   |
| Content  |
| <ul style="list-style-type: none"><li>• Did the speaker adequately explain why this study was necessary?</li><li>• Was the subject introduced with enough background information for the lay scientist to follow the research? Was more background information presented than was necessary to understand the research project or article?</li><li>• Did the speaker appear to understand the project or article?</li><li>• Could the speaker relate the article to his/her own research?</li><li>• Was a central hypothesis for the work presented?</li><li>• Were the methods made understandable to the lay scientist?</li><li>• Did the speaker routinely digress during explanations?</li></ul> |
| Organization   |
| <ul style="list-style-type: none"><li>• Did the presentation contain all necessary elements, constructed in a logical sequence? (Rationale, background information, methodology, experimental design, data, results, intermittent summaries including interpretation, author and presenter conclusions, cumulative summary, future directions, strengths/weaknesses, audience questions)</li></ul>   |
| Questions  |
| <ul style="list-style-type: none"><li>• Could the speaker answer simple clarification questions that would indicate that (s)he had thoroughly read the article?</li><li>• Could the speaker answer more complex questions that would indicate a solid grasp of methodologies, experimental design, and findings and their implications?</li><li>• Did the speaker demonstrate higher order thinking by independently identifying strengths and weaknesses of the research or the article or promising future directions? Could the speaker pose "thought questions" to the audience?</li></ul>   |

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a first-year student, the presentation must provide details of the planned thesis research. Scheduling is based on evenly distributing presenters from a given laboratory throughout the semester to maximize variety from week to week, and requiring the more senior graduate students to present earlier in the semester to serve as role models. The student first discusses the presentation outline with the thesis advisor, dividing the research plan into discrete, testable hypotheses ("specific aims"). No more than 2 specific aims are recommended for a MS thesis, and no more than 3 aims for a PhD dissertation. Each aim is subdivided into specific experiments. The presenter is encouraged to practice with the course master, the research director, and graduate students not familiar with the research field. Only the actual seminar is typically videotaped, but practice sessions may be videotaped as well.

A 45-minute presentation should be planned, with an additional 10 minutes allotted for questions that may be posed during and after the presentation. The first 15 to 20

minutes of the hour should be spent properly introducing the subject and providing background information sufficient to demonstrate the need for the research. The rationale behind each specific aim and experiment should be explained. Potential "pitfalls" in the plan should be indicated, and how these will be addressed should be discussed. Experimental methodology should be presented, but only at the level and to the extent that the data are understood. Each part of each figure or table should be presented, and the audience should understand the presenter's interpretations of the results before the seminar is allowed to proceed. Conclusions should be provided whenever possible, as well as future directions of the work. Speculations on the meaning of research findings, when identified as such, are encouraged. This practice stimulates discussions that could significantly improve the thesis and subsequent publications, and that may lead to a future troubleshooting session that spares the speaker (or a student in the audience) from an unfruitful research

Table 2. Criteria for Grading Written Critiques

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Format

- Is the submitted Word file professional in appearance? Are 12-point type and double spaced, full-justified paragraphs used with 1-inch margins?
- Are the two paragraphs 4 or 5 sentences each, and balanced in size? Does the critique exceed one page?
- Was the critique submitted before the deadline?

Grammar

- Are words spelled correctly? Are misunderstandings of word meanings evident? Is the most appropriate word chosen? Are informal words and phrases avoided?
- Is the punctuation correct? Are clauses appropriately joined with commas, hyphens, semicolons or colons? Are complete sentences used? Are “run-on” sentences used?
- Are nouns, verbs, adjectives and adverbs properly used and positioned in the sentence? Are verbs conjugated?
- Are ideas organized in a logical fashion?

Content

- Is Paragraph 1 a critique of the research project or literature article, and not a summary? Is Paragraph 2 a critique of the presentation, and not a summary?
- Are the comments superficial (eg, noting a typographical error), or do they indicate higher-order thinking (eg, noting an experimental design flaw and proposing an improvement)?
- Are the criticisms constructive?
- Is an understanding of the research presented evident?

Science writing aspects

- Is the passive voice used to indicate that the data and results are recorded history and not ongoing developments?
  - Are opinions and speculations distinguished from findings and facts?
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direction. It is also hoped that the “works in progress” format will facilitate exchange of methodologies among the DUSOP pharmacology/toxicology laboratories and thus benefit all of the various research programs. The grading criteria (Table 1) reflect the desired outcomes of the oral presentation.

**Literature Review (“Journal Club”) Seminar.** GPHSC 694, the spring semester graduate pharmacology/toxicology seminar course, was renamed *Oral/Written Communication Skills in Pharmacology/Toxicology II*. In this course, each student presents a recently published peer-reviewed scientific article of his/her choosing, subject to the approval of the course master. The article must be approved no later than 2 weeks before the presentation date. Students are encouraged to browse PubMed, Current Contents, or similar literature databases when searching for a suitable article, consulting the thesis advisor when necessary. The paper should be no more than 3 years old and preferably published within the last year, and must report novel findings (ie, the paper must not be a review article). The subject matter does not necessarily have to fall within the fields of pharmacology or toxicology, but should communicate concepts or methods applicable to those in a pharmacology/toxicology department. The article should be of interest to at least some students outside of the laboratory of the presenter, as opposed to a paper only appreciated by the cognoscenti in the presenter’s field of study. Photocopies or PDF print-

outs of the article must be placed in student and faculty mailboxes (or PDF files e-mailed to all relevant students and faculty members) no later than 48 hours before the presentation. These copies must be sufficiently clear such that the reader can independently follow the figures and text.

For this seminar, both the dress and the type of presentation are less formal, the latter meaning that a “chalk talk” or a presentation using transparencies on an overhead projector should be delivered rather than a *Power-Point* presentation. The rationale behind this change in format between semesters is that the type of seminar given depends on the situation or venue, and the student should be prepared to speak effectively regardless of the conditions. A 45-minute seminar similar to that described above for the GPHSC 693 course should be planned. There are 2 principal differences between the semesters. First, in keeping with the informal journal club format, students are encouraged to ask more questions throughout the presentation instead of waiting until the end. This is meant to force the presenter to “think on his/her feet,” and to simulate a thesis defense or interview atmosphere. Second, the presenter focuses on critically analyzing the literature article for strengths and weaknesses, and the student audience participates in this process, as if a manuscript is being reviewed for journal publication. The speaker should conclude the presentation by relating the work to his/her research or explaining the applicability of a new method to existing departmental research programs.

### **Written Component**

A 1-page, formally written scientific abstract must be provided by the presenter to all departmental faculty members and graduate students at least 48 hours before the presentation. In order to train the student to communicate scientific findings in general terms (eg, for annual reports, foundation grant applications, and the lay press, a second abstract that is written for the lay person is now required of the presenting graduate student. The course master and the thesis advisor offer constructive criticism of both abstracts a week before the presentation. The abstract writing requirement pertains only to the fall semester GPHSC 693 course.

For both semesters, students write critiques of most of the presentations. For the 15-week schedule, the student can elect not to write a critique for any 5 seminars. The critique must be submitted to the course master by e-mail as a *Word* file by the Monday following the Thursday seminar. Critiques should be short (2 paragraphs of 4 sentences each) and should take no more than 30 minutes to write. Paragraph 1 should discuss the strengths and weaknesses of the research project (GPHSC 693 course) or literature article (GPHSC 694 course) with respect to its scientific rationale, experimental design, clarity, and importance to the field. This paragraph should not provide a summary of the research plan or literature article. Paragraph 2 should discuss the presentation itself in a way that provides constructive criticism for the speaker. The speaker does not read these student critiques, but anonymous comments from the critiques are paraphrased in a formal critique written by the course master for the presenter. Students are instructed not to use the 4 sentences of the second paragraph to make comments such as, "He did a good job," which conveys little. Instead, specific comments on presentation content and delivery are expected (criteria are listed in Table 2). The 2 paragraphs should be formally written and of manuscript quality.

### **Class Participation**

All students are expected to contribute to the in-class discussion of the research project or literature article as part of their grade. Senior students are expected to lead this exercise. The faculty members play a secondary role, usually as facilitators or to resolve an impasse. The class was instructed that asking simple "clarification" questions of the speaker did not count as "participation," and that questions or comments that reflected higher-order thinking and elicited discussion were expected.

### **Attendance**

Attendance and participation are mandatory for as long as the student is in the degree program. An unexcused absence results in an additional presentation re-

quired of the offender during that semester, and an unexcused absence on the day the student is scheduled to present results in 2 additional presentations during that semester. If the student obtains an excused absence (eg, because of the death of an immediate family member, debilitating illness, or a scientific meeting out of town) on his/her seminar date, it is the responsibility of the student to switch dates with another student. Absences unresolved to the satisfaction of the course master result in an "incomplete" ("I") grade for the semester, which is converted to an "F" unless an additional presentation is given during the following semester.

## **ASSESSMENT**

### **Self-assessment**

To allow the student presenter to most directly assess his/her own performance, all seminars were videotaped. A VHS tape copy was given to the presenter 1 week after the seminar, and the course master kept an archival copy that other students could access for instructional purposes. A web site with streaming video of the seminar was also created for the occasional student who had commenced employment outside of Pittsburgh but still had to participate in the course until his/her thesis was successfully defended. Presenters were encouraged to watch the tape or streaming video with the course master to evaluate their performance in the context of the criteria found in Table 1, or to at least review the video on their own. The course master and other faculty members made a special effort to assist first-year students in their preparation, and international students were offered the same assistance when necessary. Duquesne University assesses the oral and written English communication skills of all new international students via videotaped practice lectures and writing samples, and those found lacking must complete "English as a second language" courses.

### **Assessment by Other Students**

All students evaluated the performance of each presenter in the second paragraph of their 1-page critique of the presentation (see "written component" section above). Once the students realized that their presenting colleague would never see the critiques, their writing began to include candid yet constructive criticisms such as those given in Table 1. Chief criticisms included (1) too rapid delivery; (2) verbatim reading; (3) poor explanations of schematic diagrams, experimental design, or methodology; and (4) failure to identify non-obvious weaknesses in the research or article. Excerpts from these critiques, combined with those from critiques by faculty members in attendance, influenced the official letter of critique written and the grade given by the course master.

### **Assessment by the Faculty Member**

Grading for both courses was divided evenly between the oral and written contributions of the student. The seminar presentation accounted for 35% of the total grade, and class participation was assigned 15%. The writing component, consisting of the weekly critiques, represented 50% of the grade. The seminar abstracts prepared by the presenter for the “work-in-progress” seminar (693 course) were not graded; these were refined by the student with the aid of the course master, and served as practice sessions in formal writing. Another key aspect of the conversion from mere seminar courses to the new “oral/written communication” format was the switch from “pass/fail” to “A-F” grading. In the opinion of the course master (the author), imposing “A-F” grading clearly improved the quality of the presentations and the written critiques and increased the level of participation of the students in the audience. Prior to this change, several students performed just well enough to avoid having to repeat the exercise. On average, 4 of the 5 pharmacology/toxicology faculty members were in attendance (rarely only 3, frequently all 5). The criteria used by faculty members in arriving at a presentation grade are listed in Table 1. Constructive comments seeking to rectify problems related to outcomes implied in Table 1 were communicated to the course master. Many of the grading criteria/outcomes found in Table 1 were present in the course description/syllabus distributed to students and faculty members at the beginning of the semester. Beyond this, no overt attempt to normalize criteria among faculty members was made, but faculty critiques indicated that the same criteria were being employed. The presentation grade was determined by averaging grades provided by all pharmacology/toxicology faculty members in attendance, with a composite grade from the student critiques, as estimated by the course master. Faculty members were instructed to use the following scale in assigning presentation grades: an “A+” represented an outstanding performance, one that could not be improved upon; an “A” indicated that the student performed as well as one could reasonably have expected; an “A-” meant that the student could improve in some significant aspect of an otherwise excellent performance; a “B+” suggested an above average but not stellar performance; a “B” indicated an average performance; a “B-” grade meant that the performance was below par, but passable; a grade of “C+” indicated that the seminar was unacceptable, and that another presentation on a different subject (in the case of the GPHSC 694, or “Journal Club,” course) must be prepared and delivered at the end of the semester. In averaging the above letter grades, point values of 4.3, 4.0, 3.7, 3.3, 3.0, 2.7 and 2.3 were assigned, respectively, and

the course was graded using the traditional 4-point GPA scale.

The course master wrote a formal letter of critique to each presenter for each seminar, which included the grade, identification of strengths and weaknesses of the presentation, and useful comments from other faculty members and student peers. In arriving at a grade, the faculty member took into account first-year graduate student or undergraduate status, and whether English was the student’s second language. Typical strengths of the presentation were the level of organization, background research, and preparedness for questions. Typical weaknesses were recognizing design flaws and answering the “deeper” questions that required application of a technique or finding to another biological system. Consultation with the course master was encouraged toward improving subsequent presentations.

The class participation grade was determined solely by the course master, based on the number and quality of comments made by the student in the seminar audience. Letter grades for participation were assigned, in a manner loosely based on the scale given above for rating a seminar presentation, after the fifth, tenth, and fifteenth seminars. The grades given at the 5- and 10-week marks were estimates of what the final participation grade would have been if the semester had ended at that point. In other words, grading for the intermediate thirds of the semester only served to assess the participation level of the student so that the student could make corrections accordingly, and the grade after Week 15 was indeed the final participation grade. Eliciting class participation from first-year graduate and undergraduate students, especially new international students, was admittedly difficult. Knowing little about the subject matter or even the field of study was daunting to these students, and self-consciousness about oral English skills also undoubtedly suppressed participation. Other than taking these issues into account when grading and assuring the class that there was no such thing as a “stupid” question or comment, the course master did not push these students to participate.

To assess the formal scientific writing of the graduate students, the course master used the Table 2 criteria to provide a critique of the student critiques. “Red pen” editing of every student critique was returned to the writer before the next seminar. The student was encouraged to challenge the revision of the course master if the editing was not self-explanatory or was viewed as merely an alternative version of what was written. In addition to consultations with the course master, remediation could include scheduling classes with the Duquesne University Writing Center. Occasionally, a student’s writing improved during the semester to the point that the course

master could not significantly elevate it further, in which case the student was allowed to complete less than 9 critiques for the course.

### **Assessment of the Instructor and Courses**

Through quantitative and subjective responses on the Duquesne University teaching evaluation questionnaire (TEQ), the students indicated their appreciation of the efforts to improve the courses. The course master has received TEQ scores of 4.67 and 5.00 since implementing the changes, 5.00 being a perfect score on the 5-point Likert scale employed. The feedback from the 22 completed TEQ forms included 2 criticisms but was otherwise positive. The more legitimate complaint was that the criteria for grading presentations and class participation were unclear to the student. These criteria have since been explained to the class by the course master, and student self-assessments of these grades were consistent with the grades given by the course master. The second criticism was that the students should not have to repeat the 2 courses each year. While this is an admittedly unusual curricular requirement, the students nevertheless acknowledged that they made progress with each semester. Other advantages of these “perpetual” courses are that the senior students stimulate discussion of the subject presented and provide guidance to junior students with respect to critical thinking and presentation skills. The substantial amount of work involved with the course may also provide extra incentive for students to graduate in a timely fashion.

The most positive aspects of the courses identified by the students were the critique-writing process, the course master’s formal letter of critique, and the seminar videotaping. The students most appreciated receiving the “red pen” editing of their critiques, which indicated exactly how their writing fell short and the next steps toward improving. Students commented that they became more confident in their writing and found writing manuscripts and other formal documents less daunting, consistent with the outcome previously reported for a BS Pharmacy scientific writing course.<sup>14</sup> Students also felt that the formal letter of critique, coupled with analysis of the videotape, improved future seminar presentations. Learning from videotape can be as effective as instructor-directed teaching in helping students improve communication skills.<sup>15</sup> One student mentioned that he would never have recognized and addressed the negative aspects of his “body language” during a presentation as pointed out by the course master if not for the videotape. The most recent graduate of the DUSOP pharmacology/toxicology program, currently a postdoctoral fellow at a prestigious research institute, recently mentioned to her thesis advisor that the revised seminar courses constituted the strongest

feature of her graduate education and helped prepare her for the postdoctoral interview seminar.

### **DISCUSSION**

The students felt that reviewing videotapes of their performances improved their presentation skills, in keeping with previous findings.<sup>16</sup> The students also reported that their comprehension of oral and written information, and especially their ability to analyze and evaluate primary data, had improved from the practice of writing the seminar critiques, as had their ability to write formal scientific prose. The 2-paragraph, 1-page writing format may not improve all aspects of the student’s formal writing. Skills involved in writing manuscripts or theses, such as organizing paragraphs and sections or proper citation of references, are not addressed by the exercise. Unfortunately, these aspects are necessarily beyond the scope of the course. Nevertheless, 2 faculty members commented that their graduate student manuscript and thesis writing had noticeably improved, and attributed this to these courses. All of these skills are critical to succeed in academic pharmacy or other biomedical science fields<sup>17</sup>; thus, DUSOP pharmacology/toxicology graduate students should be well positioned in this regard for productive careers. PharmD students also need early intervention in building oral and written communication skills,<sup>18-20</sup> and the 2 courses described above were found to be extensible to PharmD students involved in the DUSOP “research track” concentration.<sup>13</sup> It is hoped that the immersion in scholarship entailed by these courses will stimulate PharmD interest in an academic pharmacy career. Regardless of career path, acquiring the oral and written communication skills described herein cannot help but improve the professional prospects of pharmacy students.

### **SUMMARY**

This novel seminar/writing course was well received by both graduate students and the pharmacology/toxicology faculty members. The audiences were interactive and provided valuable feedback that should improve the research plan of the presenting student. With the help of the senior graduate students, novice speakers became capable presenters, as evidenced by critiques supplied by students and faculty members in the audience. There was, nevertheless, room for improvement regarding class participation, and an “on-line discussion forum”<sup>21</sup> may be employed in the future to ensure that the non-presenting students have read and cogitated on the research abstract or literature article prior to the presentation.

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