

# Assessing Writing Perceptions and Practices of Pharmacy Students<sup>1</sup>

Paul L. Ranelli

*School of Pharmacy, University of Wyoming, P.O. Box 3375, Laramie WY82071-3375*

Jane V. Nelson

*Center for Teaching Excellence, University of Wyoming, Laramie WY 82017-3375*

This study aims to assess the writing perceptions and practices of pharmacy students. In fall 1996, an anonymous survey of writing self-assessment was administered to 45 second-year pharmacy students in a public health course. Students rated their confidence to communicate successfully for nine specific tasks and to perform 21 writing mechanic skills using a 0-100 scale, where 0 = no chance and 100 = completely certain. Students also indicated the importance of writing in pharmacy practice using a 0-100 scale, where 0 = not important at all and 100 = extremely important. To assess improvement in ability to write position papers, the first and third essays of each student were assessed by a panel of six readers using a holistic scoring procedure, where 1 = weakest and 6 = strongest. Writing ability was the mean of each student's scores on the two position papers. Composite communication confidence and mechanics confidence scores were calculated as the overall mean of all items in the respective categories; simple regression models were tested using these variables individually as predictors of students' writing ability. The composite communication confidence score was 73.2 percent, and the composite mechanics confidence score was 79.0 percent. Students rated writing skills in pharmacy practice as important (75.4 percent). Communication confidence and mechanics confidence were significantly correlated with writing ability ( $r = 0.334$  and  $0.419$ , respectively) and with each other ( $r = 0.847$ ). Communication confidence explained 11 percent of the variance in writing ability, and mechanics confidence explained 18 percent. Writing scores significantly improved by a mean of 0.60 (SD = 1.13) on the second paper. These findings suggest some strategies for teachers to use in writing-intensive courses. A self-confidence survey given at the beginning of a course can be a productive diagnostic and learning tool. In their responses to student writing, teachers can focus less on correcting surface errors and more on issues of critical thinking, use of evidence, and the nature of disciplinary conventions. Finally, teachers can be confident that a writing-intensive course does make a positive difference in students' ability to improve their writing.

## INTRODUCTION

The movement of the pharmacy profession from a product-based model to an information-based model has brought communication skills to the forefront of pharmacy education. Much emphasis has been placed on students' oral counseling skills in both clinical and administrative pharmacy coursework, and students at most schools have the opportunity to participate in the Patient Counseling

Competition sponsored by the U.S. Pharmacopeia and the American Pharmaceutical Association. Few pharmacy educators have placed the same emphasis on writing skills, even though pharmacists in all practice settings have many

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opportunities and responsibilities that involve writing, such as writing letters of recommendation, annual performance evaluations, letters to the editor, articles for publication, or proposals for new clinical services(1-4). Indeed, writing is a major component of some job descriptions for pharmacists, like those in drug information, administration, and pharmacy journalism. We believe that writing should be incorporated into pharmacy curricula as an integral part of pharmacy education, both for the immediate purpose of learning course material and for the long-range purpose of becoming a professional.

As a step in evaluating the importance of writing in and to the profession, this study aims to assess the writing perceptions and practices of pharmacy students. Early in the fall semester, 1996, we administered an anonymous survey of writing self-assessment to second-year pharmacy students in a required public health course. We then checked features of writing that students completed early in the semester against these self-assessments. After the course concluded, we tested for improvement in writing by comparing two similar writing assignments, one written early in the course and one written near the end. With our study, we show the relationship between writing self-confidence and writing ability, and we also demonstrate that students can improve their writing as a result of experiencing a writing-intensive course.

#### WRITING IN THE DISCIPLINES

When this study was conducted in fall 1996, second-year pharmacy students at the University of Wyoming took a required course in public health that fulfilled a major writing requirement in their professional curriculum. The course was designed to encourage students to do the following:

- search for knowledge about past and contemporary health problems;
- prepare critical, balanced, and informative approaches to evaluate current trends in health care;
- comprehend the importance of writing in a professional career; and
- develop inductive and deductive thinking methods that will be of value in any work setting.

Writing, which was a dominant component of the course, came in the form of brief article reviews, three position papers, and a research paper. This course was designed to use writing as a way to demonstrate the kind of writing pharmacists and other health-care professionals are likely to do.

Successful completion of the course partially fulfilled a writing-across-the-curriculum requirement for degree programs at the university. It was a designated W3 writing course, the third stage of the university's three-tiered writing program for entry-level degrees.<sup>2</sup> Two explicit requirements for a W3 course are that the writing must be oriented toward professional writing in a discipline, in this case pharmacy, and that each student must submit writing assignments totaling at least 40 pages. The main objective for W3 courses at the university is to help students understand the impact of writing and its importance in the professional world; it is not a main objective of a W3 course to teach general writing skills. In other words, the public

health course required that students exhibit their work as health professionals through their writing.

The writing program at the University of Wyoming, including the development of W3 courses in a variety of disciplines, is based on the conviction that writing is a significant learning tool in a university education. Teachers across the disciplines and from a wide variety of colleges and universities have documented the benefits of incorporating writing into their courses(5). Writing fosters understanding of material, helping students to learn information and refine their understanding of issues. Through writing, students begin to participate more actively in their disciplines. They discover the relevance of the subject in their own lives and develop multiple perspectives. In addition, writing is a tool to teach decision-making and the development of independent thinking. By writing, students gain control over learning, develop their professional voices, and begin to identify themselves as professionals.

Teachers have also discovered that writing assists in fostering class discussion and building community. Writing allows for examination and reexamination, debate and decision-making, and choice and revision. Writing is a cognitive activity that requires more higher-order thinking skills of the communicator than might be required of a speaker, listener, or reader(6). For the most part, teachers who use writing as a tool for helping students learn content and disciplinary conventions are convinced of its efficacy, although few research studies have been conducted to provide empirical evidence for the link between writing and learning.

Demonstrating actual improvement in writing skills has been more problematic than addressing the question of whether writing helps students to learn a discipline. The major difficulty is that "improving student writing is a complex business, involving as it does the student's motivation, knowledge, reasoning skills, grammar, mechanics, creativity, training in a specific discipline, and more"(7, p. 70). In addition to the complexity of developing an instrument to measure the intricacies of writing and improvement in writing, it is difficult to know how to test for the effects of a writing program when so many other factors are at play. If upper-division students show an improvement in writing, causes of this improvement could include such components as the natural maturing process through four or more years of education, an improvement in study habits, a change in faculty or teaching methods, or improvement in lower-division courses or curricula that carried through to upper-division learning.

To demonstrate the effect of a writing-across-the-curriculum program, Fulwiler(7) recommends two qualitative and two quantitative approaches. One qualitative approach includes keeping descriptive accounts of the kinds of writing activities that lead to improvements, such as multiple drafts and peer review. Another qualitative method of evaluating writing improvement is to conduct a longitudinal study of one or two students throughout several years of their undergraduate education. Neither of

<sup>2</sup> When the school changed to an all-PharmD curriculum in fall 1997, the W3 requirement was removed from the public health course and spread across two other required courses. The public health course still maintains a heavy writing component, though, with students required to write 10 one-page essays or summaries throughout the semester.

these methods demonstrates improvement of a quantifiable nature. Quantitative approaches include: assessing the attitude that students have about writing; and studying students' writing in a specific course, comparing their early writing to later writing to evaluate improvement. These two quantitative methods form the basis for our research conducted on the W3 pharmacy course at the University of Wyoming.

## METHODS

**Self-Assessment Survey.** All 45 pharmacy students enrolled in the public health class were given a self-assessment survey at the beginning of the course in fall 1996. Survey items grouped into four parts were designed to capture how students felt they could communicate in writing and perform writing mechanics. Items were adapted from Pajares and Johnson(8), Shell, Murphy, and Bruning(9), and Jones(10).

1. Students rated themselves on their confidence to communicate successfully in writing on nine specific tasks using a scale from 0 to 100, where 0 = no chance and 100 = completely certain.
2. Students rated themselves on their confidence to perform 21 writing-mechanic skills, also using the 0 to 100 scale where 0 = no chance and 100 = completely certain.
3. Students indicated how important students found writing to be in pharmacy practice using a scale from 0 to 100, where 0 = not important at all and 100 = extremely important.
4. Students provided information about their gender and date of birth.

Table I lists the items included in parts 1 and 2 of the survey.

**Error Analysis.** To determine if there was a difference between the confidence of students to communicate successfully in writing and their ability to write, an error analysis of their writing was completed. Six items from the 21-item mechanics portion of the self-assessment survey were selected as categories for error analysis: spelling, punctuation, parts of speech, tenses, vocabulary, and grammar. These six items were chosen because they lend themselves to quick and accurate analysis. The chief reader (JVN) read the first three or four paragraphs from each writer's first essay to determine: (i) whether or not there were any errors in each category; and (ii) how many errors existed in each category. The results were tabulated as 1, 2, and 3 or more errors per category. Repetitive errors were not counted as separate errors. For instance, if the same word was misspelled several times, this misspelling was only counted once; if a writer committed several comma splices, this was counted as only one kind of punctuation error.

**Position Papers.** During the 15-week semester, each student prepared three five-page position papers in reaction to various topics considered in the course. The student chose the specific theme for each paper under the general topic selected by the instructor (PLR). The general topics for each position paper assigned in order were as follows:

the U.S. health care system, the environment, and AIDS. Students were instructed that position papers were not forums to present personal opinions about some topic or issue. Rather, position papers were to reveal a measured and objective response to a topic or issue that grew from class discussion, assigned readings, and explorations in pertinent scientific literature. Expectations were that position papers should reflect strong intellectual effort as demonstrated by a careful analysis and full understanding of the specific theme. The writer was expected to take a clear position on the issue and justify that position.

**Scoring Procedure.** To determine whether students improved in their ability to write position papers, the first and third essays of each student (a total of 90 essays) were assessed using a holistic scoring procedure originated by the Educational Testing Service (ETS) and developed throughout the last two decades in a variety of institutional settings. The procedure involves a system of scoring by a team of readers who are first trained to use the scoring guide and then who read together in a scoring session. The scoring is double-blind: both the writer's name and the order of the essay are concealed.

The ETS system is designed to yield useful and reliable ranking information with a single score. Its strength is that it uniquely combines norm-referenced and criterion-referenced test theories (11). Holistic scoring is norm-referenced because it uses sample papers from the actual group being assessed to establish scores and standards. At the same time, a holistic scoring guide depends on the goal of the program or assignment for the development of assessment criteria. It is a flexible instrument in both theory and practice that economically and reliably produces a ranking system. The weakness of the ETS system as an assessment instrument is that it provides no details about the writing; thus, it is not a preferred formative assessment.

For the scoring session in our study, the chief reader (JVN) first developed a holistic six-point scoring guide based on the assignment guidelines given to the students and on the features of the 90 papers being scored.<sup>3</sup> The criteria on the scoring guide addressed four categories: (i) content, including grasp of the problem and defense of the position; (ii) organization, including length, flow, and persuasiveness of the introduction and conclusion; (iii) style; and (iv) use of references, including citation(s). A score of six on this scoring guide described the strongest of the essays in the set; a score of 1 described the weakest. After the scoring guide was developed, the chief reader selected six essays from the 90 to serve as models for each of the six scores in the scoring guide.

The scoring session itself occurred on one weekday from 9 AM to 4 PM in January 1997 after the course was completed and grades were issued. During the first hour of the scoring session, the readers read and reviewed the scoring guide and scored the six models. The readers then discussed the scoring guide in relation to the essays they had just scored, making amendments to the scoring guide so that it closely matched the features they discovered in the essays. After amendments were made, three more essays were scored by the group of readers as a check that

<sup>3</sup>A copy of the four-page scoring guide is available from Paul L. Ranelli upon request.

**Table I. Percent mean scores of items in self-assessment writing survey (N = 45)**

Survey item	Mean	SD
Communication confidence for specific tasks <sup>a</sup>		
Prepare a resume describing your employment history and skills	80.7	16.4
Write a one- or two-sentence answer to a specific test question	85.2	11.0
Compose a one- to two-page essay in answer to a question	73.8	17.2
Write a term paper of 15 to 20 pages	61.9	24.0
Write a scholarly article for publication in a professional journal in your field	55.1	23.5
Write a letter to the editor of the daily newspaper about a health-care topic	69.2	21.8
Write useful class notes	82.0	14.4
Prepare a paper that reads as a balanced account on a controversial topic	72.0	17.4
Compose a paper summarizing a reading assignment	78.0	16.3
Composite score for communication confidence <sup>b</sup>	73.2	14.0
Confidence on performing writing mechanics <sup>a</sup>		
Correctly spell all words in a one-page paper	83.4	21.7
Correctly punctuate a one-page paper	77.3	19.8
Correctly use parts of speech (that is, nouns, verbs, adjectives)	83.6	15.5
Correctly use plurals, verb tenses, prefixes, and suffixes	82.4	14.9
Write a paper with good overall organization ( <i>e.g.</i> , ideas in order, effective transitions)	80.3	14.7
Choose words that a reader can understand	85.3	13.5
Know how the reader will use your document	73.7	18.7
Use vocabulary appropriate to the subject and purpose of the writing	80.1	14.2
State the purpose of the writing to the reader	83.7	12.9
Research the subject	81.8	14.9
Identify problems to be solved that the topic suggests	78.0	14.2
Make clear statements of ideas	80.1	13.4
Avoid common grammatical errors of standard written English	78.3	17.5
Quote sources accurately	79.7	18.0
Write effective introductions and conclusions	78.9	14.0
Write effectively under pressure	70.7	20.4
Paraphrase properly	74.0	16.6
Collaborate with others during reading and writing on a given project	76.1	20.0
Revise to improve word choice	78.7	16.5
Revise awkward phrasing and vague language	77.3	19.8
Follow a revision strategy to select, add, substitute, or delete information when the prospective readers to the paper have changed	78.1	18.2
Composite score for mechanics confidence <sup>b</sup>	79.0	13.4

<sup>a</sup>Measured on a scale of 0 to 100, where 0 = no chance and 100 = completely certain.

<sup>b</sup>Composite score calculated as the overall mean of all items in the category.

all readers agreed on the scoring guide.

Upon completion of this initial training period, the scoring session started. The writers' names had been omitted to insure anonymity, with each of the 90 essays being given a code number. The essays were distributed to the readers in random order. Each essay was read by two different readers. The score of the first reader was recorded and then concealed before an essay was distributed to a second reader. After an essay received two scores, a recorder checked for reliability. If an essay received two scores that differed by more than one point (*e.g.*, if it received scores of 3 and 5, or 2 and 4), the essay went to a third reader. This scoring session achieved 92 percent reader interreliability; 90 percent and above is considered to be an acceptable interreliability for any scoring session of this kind(12).

**Panel of Expert Readers.** The scoring panel consisted of the chief reader (JVN), who created the scoring guide and conducted the training session, and five readers who scored the essays. The five readers were all trained University of Wyoming Writing Center staff members: two were writing instructors in the Department of English who taught a variety of writing classes in addition to work-

ing in the Writing Center, two were graduate students in the English Department who taught first-year writing courses and tutored in the Writing Center, and one was a senior English major who was a trained Writing Center tutor.

The Writing Center at the University of Wyoming serves a wide variety of writers from all the disciplines. Over 60 percent of the writers who seek assistance at the Writing Center are seniors and graduate students writing technical reports, theses, and other substantial papers in their disciplines. The tutors who work in the Writing Center thus have broad experience in assisting writers in specific disciplines with matters of conceptualization, focus, organization, style, and disciplinary conventions.

**Data Analysis.** Descriptive statistics were compiled for all variables, and Student's *t*-tests and chi-square analyses were used where appropriate. Writing ability was computed as the mean of each student's scores on the two position papers evaluated by the expert readers. The difference in writing ability is the mean writing ability for paper one minus the mean for paper two.

To determine whether students' self-assessment of communication confidence and of mechanics confidence

were related to their writing ability, a test for the significance of the correlations was performed using two-tailed Pearson correlation coefficients. A multiple regression model was tested using communication confidence and mechanics confidence as predictor variables to explain the variance in students' writing abilities.

In all statistical analyses, the a priori level of significance was  $P \leq 0.05$ .

## RESULTS

All 45 pharmacy students enrolled in the class completed the self-assessment survey and class assignments. The sample consisted of 23 men and 22 women with a mean age of 27.7 years (SD = 6.1).

**Self-Assessment Survey.** The mean values for items included in the communication confidence variable ranges from 55.1 percent (SD = 23.5) for writing a scholarly article for publication to 85.2 percent (SD = 11.0) for writing a one- or two-sentence answer to a specific test question (Table I). The composite communication confidence score, which was calculated as the overall mean for all nine items, was 73.2 percent (SD = 14.0).

Table I also shows the mean values for the 21 items in the mechanics confidence variable. The variable ranged from 73.7 percent (SD = 18.7) for knowing how the reader will use your document to 85.3 percent (SD = 13.5) for choosing words that a reader can understand. The composite mechanics confidence score, which was calculated as the overall mean for all 21 items, was 79.0 percent (SD = 13.4). Students rated writing skills in pharmacy practice as important (75.4 percent  $\pm$  15.9), with individual results ranging from 30 percent to 100 percent.

**Error Analysis.** Table II shows the results of the error analysis of the students' first position paper. Using a chi-square goodness-of-fit test on the six mechanics variables to assess the distribution of the errors for a significant pattern, we found that only punctuation showed no departures from randomness in the distribution of errors. The remainder of the items showed a substantial number of students with zero errors in the writing sample, except for the use of tenses and grammar, where there were significant departures from random in the number with zero and one error. These results give some credence to the students' high self-assessments of communication confidence and mechanics confidence.

**Comparisons.** Table III shows the correlation matrix for the communication confidence, mechanics confidence, and writing ability variables. Not only are the composite scores for communication confidence and mechanics confidence significantly correlated with writing ability ( $P < 0.05$ ), but they are also significantly correlated with each other ( $P < 0.01$ ). The self-assessments were not correlated with change in writing ability over the course of the semester. When analyzing the students' self-assessment ratings by separate one sample *t*-tests, considering 50 percent to be a rating of committing errors 50 percent of the time, the subjects rated themselves significantly high (Communication confidence, Mean = 73.2, SD = 14.0,  $t = 11.1$ ,  $P < 0.001$ ; Mechanics confidence, Mean = 79.0, SD = 13.4,  $t = 14.4$ ,  $P < 0.001$ ).

**Table II. Error Analysis of First Position Papers (N = 44)**

Category	Percent of students with 0 or 1 error	Number of errors				Chi square <sup>a</sup>
		0	1	2	3 or more	
Spelling	65	20	9	10	5	11.091 <sup>b</sup>
Punctuation	37	10	7	13	14	2.727
Parts of						
Speech	77	30	4	7	3	44.545 <sup>c</sup>
Tenses	80	17	18	4	5	15.455 <sup>c</sup>
Vocabulary	84	31	6	6	1	50.000 <sup>c</sup>
Grammar	70	17	14	5	8	8.182 <sup>b</sup>

<sup>a</sup>All Chi-square analyses have 3 degrees of freedom.

<sup>b</sup>Significant at  $P \leq 0.051$ .

<sup>c</sup>Significant at  $P \leq 0.051$ .

The high correlation of the self-assessment of communication confidence and mechanics confidence variables ( $r = 0.847$ ,  $P = 0.01$ ) indicates the relatedness of these variables. If the students rate themselves high in their confidence to communicate in writing, they likewise rate themselves high in their ability to carry out the mechanics of writing. Because multiple linear regression assumes that predictive variables in the model are not multicollinear (highly correlated), we were unable to use both confidence variables simultaneously as predictors of writing ability. Therefore, only simple linear regressions were performed.

Simple linear regression models using either communication confidence or mechanics confidence as the predictor of writing ability were examined (Table IV). While each of the two simple linear models was significant ( $P < 0.05$ ), the models did little to explain the variation in the writing scores. Communication confidence explained only 11 percent of the variation in writing ability, and mechanics confidence explained only 18 percent.

To assess improvement in writing ability, a two-tailed Student's paired *t*-test was performed on the scores on the position paper early in the semester and the position paper at the end of the semester. Scores improved by a mean of 0.60 (SD = 1.13) on the second paper, and this difference was significant ( $t = -3.57$ ,  $df = 44$ ).

## DISCUSSION

**Self-Assessment.** The pharmacy students in this study rated themselves high on their ability to communicate and to execute mechanics in written tasks. Their high confidence may be related to the fact that these students were mature, upper-division students who had followed a rigorous pre-pharmacy curriculum before being admitted to the pharmacy program. This curriculum contained substantial coursework in the hard sciences, including chemistry, biology, and microbiology. If the students matriculated at the University of Wyoming, they also had completed most of the general education requirements, including two writing courses designated as W1 and W2. Students admitted to the pharmacy program had a 3.0 or higher grade point average. Thus, the pharmacy students in this study had already demonstrated success in their education and could be defined as motivated learners.

The significant correlation between confidence levels and writing ability coincides with the results of previous

**Table III. Pearson correlation coefficients for confidence and writing ability variables (N)**

Variable	Communication confidence	Mechanics confidence	Writing ability	Difference in writing ability
Communication confidence	1.000 (45)			
Mechanics confidence	0.847 <sup>a</sup> (44)	1.000 (44)		
Writing ability	0.334 <sup>b</sup> (45)	0.419 <sup>a</sup> (44)	1.000 (45)	
Difference in writing ability	-0.016 (45)	0.073 (44)	0.165 (45)	1.000 (45)
Mean	73.2	79.0	3.8	-0.60
SD	14.0	13.4	0.89	1.1

<sup>a</sup>Significant at  $P < 0.01$ .

<sup>b</sup>Significant at  $P < 0.05$ .

research on the confidence levels of writers. In a study of **Table IV. Simple linear regression models of writing ability**

Independent variable	Standardized coefficients (r)	P	R <sup>2</sup>
Communication Confidence	0.334	0.025	0.111
Mechanics Confidence	0.419	0.005	0.176

R<sup>2</sup> represents the amount of variance explained, meaning that 11 percent and 18 percent of the variance is explained by each respective simple linear regression model.

30 undergraduate students in a teacher preparation class, Pajares and Johnson(8) reported a clear relationship between writing self-efficacy and writing performance. As in our study, the relationship they established was correlational rather than causal. It would be intriguing to conclude that teachers might have a positive impact on the writing performance of students by increasing their self-confidence about writing, but our study does not show that kind of causal relationship.

The correlations between self-confidence and writing ability do suggest, however, that teachers can make effective pedagogical use of a self-confidence survey in courses that incorporate a substantial amount of writing. Given at the beginning of a course, a self-confidence survey can be a productive diagnostic tool for students and teachers. Teachers can be assured that students will credibly assess their confidence about writing, and this assessment can then be used to provide additional assistance to students who are predicted to perform at lower levels on writing tasks. In addition, the value of this kind of self-assessment has become increasingly recognized as an important classroom tool to foster development and reflectivity in learning(13,14).

**Number of Errors.** The majority of students in this study (65-84 percent) had one or fewer errors in five of the six categories examined in a writing task completed early in the semester. This finding counters some prevailing beliefs about student error. Commonly, college instructors complain that year by year, or decade by decade, students commit more and more errors, but there has been no empirical evidence for an increase. In a comparative study of student writing in 1917, 1930, and 1986, Connors and Lunsford(15) found a surprising consistency in error, reporting an error percentage of 2.11, 2.24, and 2.26, respectively, for the years studied. Perhaps even more interesting, Sloan(16) reports that students do not commit

a higher percentage of errors than do professional writers. In both of these studies, the researchers point out that although the incidence of error seems to remain constant for all writers, the kind of error does change. Professional writers, for instance, do not commit as many spelling errors as do first-year college writers, probably because editors of journals have corrected these kinds of errors. Definition of error changes through time (*e.g.*, we no longer identify shall and will as a subject of error), and teachers from diverse disciplines identify errors differently (*i.e.*, the use of passive voice). This latter observation is particularly helpful in its emphasis on the importance of context in writing in accounting for variations in both defining and tolerating errors.

As Bean(17) summarizes, not only does student writing contain fewer mistakes than teachers perceive, students have more linguistic competence than a cursory review of their writing might show. Moreover, many of the errors related to an incomplete understanding of a discipline's conventions (terminology, syntax, uses of evidence, formats, etc.) will begin to disappear as students move from the novice stage to expertise. In writing-intensive courses, instructors can adopt ways of responding to student writing that focus less on correcting surface errors and more on the issues of critical thinking, use of evidence, and the nature of the discipline, which result in a more comprehensive approach to the issue of error.

**Improvement in Writing.** The pharmacy students improved significantly in their writing scores as evaluated by the expert readers. This finding should not be surprising, but once again it runs counter to an attitude expressed by many faculty that students do not seem to improve their writing or learn much about writing throughout a semester. Even the experts who scored the essays were unable to predict at the end of the scoring session if there was an improvement. In a debriefing session after the scoring was completed, the experts were asked to give their impression about which essays received the lower scores—the essays on AIDS or the essays on the U.S. health care system. The group predicted that the AIDS essays received the lower scores, and they also predicted that the AIDS assignment was the first assignment of the semester. In fact, the opposite was true in each case.

We cannot identify the causes for an increase in scores. Because of the complexity of writing, which involves motivation, knowledge, creativity, training in the discipline, and skill development, it is difficult to determine what factors made a difference in this pharmacy course. Moreover, the holistic scoring instrument did not

yield a way to determine which kinds of writing traits may have accounted for an increase in scores. The higher scores could have been a result of one or more improvements in focus, content, organization, style, and persuasiveness. The structure of the course may have contributed to improvement in writing ability. Through the repetitive task of writing three position papers, students received informative feedback from the instructor, gained continual training in the conventions of writing a position paper, read widely in the field of public health, and became comfortable with the vocabulary and modes of thought of pharmacists.

We cannot predict that students will take an increased mastery of writing from one course to another, but the results of this study suggest that a writing-intensive course does make a positive difference for students learning this important communication skill in pharmacy. It does not appear that one's self-assessment of communication confidence or of mechanics confidence is a major contributor to the improvement. Our study suggests that the experience of taking the course itself contributed to the improvement.

#### FUTURE RESEARCH

In the revision of pharmacy courses and programs to incorporate the teaching of communication skills, pharmacy educators can use two kinds of approaches to include more writing in their courses. The first approach is to determine the kinds of writing that will be most effective for the dual purpose of learning material and practicing the writing skills that students will need in the workplace. A survey of professional pharmacists in a variety of settings would yield helpful information about what kinds of writing are important. Assigning professional kinds of writing, such as letters, memos, flyers, brochures, proposals, and reports can easily be incorporated into academic coursework with significantly positive results for students. A guide like John Bean's *Engaging Ideas: The Professor's Guide to Integrating Writing, Critical Thinking, and Active Learning in the Classroom*(17) contains useful advice about how to evaluate these kinds of assignments so that they do not become a time-consuming burden for teachers.

A second approach is to test for effective ways to incorporate writing in pharmacy education from their undergraduate preparation through their professional training. Because self-confidence in writing appears to be correlated with writing ability, research about how writing ability is developed and about how students gain confidence in their writing skills would reveal what kind of pre-professional training in writing pharmacy students should acquire. For specific pharmacy courses, it would be instructive to assess pedagogical approaches to writing that may contribute to improvement in writing ability. For instance, it would be helpful to find out what kinds of

introductory activities in a course lead to effective self-assessment and diagnosis (such as diagnostic essays, grammar tests, or self-confidence surveys). It would also be helpful to inquire into the sources of student error in order to determine how to help students eliminate errors from their writing. Finally, it would be useful to assess how skill in writing improves over the period of several courses or throughout an entire pharmacy program.

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