REGULAR ARTICLES

Integrating General and Professional Outcomes Through Writing

Thomas D. Zlatic

ABSTRACT. Although both written and oral communication are becoming increasingly important for practitioners who provide pharmaceutical care, many educators have found the emphasis on writing to be inordinate or impossibly ideal. Writing to communicate is an important ability outcome for almost any academic program, but writing can also be a tool to discover, create, analyze, clarify, and evaluate ideas. This essay attempts to provide a rationale and some strategies for using writing as one means for integrating general and professional abilities.

KEYWORDS. Curriculum, writing to learn, teaching strategies, communication

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> The relation between thought and word is a living process; thought is born through words. A word devoid of thought is a dead thing, and a thought unembodied in words remains a shadow.
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> –L. S. Vygotsky

INTRODUCTION

It is naive to think that we, as adults, first have ideas and then find language to express them. Of course what is labeled by the word ''thinking'' is in reality a complex, multidimensional set of mental processes, a number of which do occur without words. We can have ineffable experiences, and we can think spatially and imagistically or have flashes of insight in which, for instance, we can discover the DNA structure through a dream image of entwined serpents. But normally, when we analyze and deliberate discursively, words are the midwives of our ideas, if not their physical embodiment.[1] Language, then, not only has an expressive and a communicative aspect but also helps to generate ideas still being formed. This phenomenon may be even more apparent in writing. ''We write,'' says C. Day Lewis, ''not to be understood; we write in order to understand.''

Human understanding often has a dialogic structure. In dialogue with others, we can, of course, broaden our perspectives and deepen our understanding as we learn from them what we did not know. But the process is not merely accretive. Imprisoned in ourselves as we are, we need interaction with others to understand not just what they think and know but what *we* ourselves know and believe. Unless challenged, we often will not recognize our beliefs and unquestioned assumptions–they exist as an invisible framework guiding our thinking. E. M. Forster's quip, ''How do I know what I think until I see what I say?'' rings true for those of us who have experienced the formulation of our opinions *during* discussion as we announce positions we never knew we had before. The encounter with the other forces us to look inside ourselves and to take positions and/or to clarify our reasons for holding them.

In writing, as we shall see, this interdependence between expression and thinking is intensified. Such an interdependence is one explanation for the recommendation by the Commission to Implement Change in Pharmaceutical Education:

> Most, if not all, [pharmacy] courses would require written assignments. Examinations should provide for written analyses of problems. Because written works usually require several revisions before excellence is achieved, the educational process must reflect this and students should be provided the opportunities to revise their papers based on constructive criticism from faculty and peers. (1)

Although both written and oral communication are recognized as becoming increasingly important for practitioners who provide pharmaceutical care, many educators nonetheless have found such an emphasis on writing to be inordinate or impossibly ideal, particularly those educators who assume that the practice of writing mainly concerns itself with grammar, punctuation, and mechanics. Of course writing to communicate is an important ability outcome for almost any academic program, but more central to the recommendation above is the realization that writing also can be a tool to discover, create, analyze, clarify, and evaluate ideas. As such, it has tremendous implications and potential for curricular reform.

Educators and practitioners have called for curricular and pedagogical reform within pharmacy education, urging a transformation toward a student-centered pedagogy that stresses active and life-long learning as students develop such abilities as critical thinking, communication, and problem solving within a professional context. More particularly, for more than 15 years, educational groups, again both within and outside of pharmacy, repeatedly have recommended that such transformation should be accelerated by the integration of professional and general ability outcomes within the professional curriculum. For instance, the Professional Preparation Network concluded: ''Based on our experiences, we view current efforts toward higher education reform as incomplete, because they fail to stress the responsibility of educators to increase the integration of liberal and professional study'' (2). Responding responsibly to such conclusions, the AACP Focus Group on Liberalization of the Professional Curriculum proposed:

> Education in the liberal arts can and should provide an important base of perspectives and intellectual skills necessary for the development and growth of professionals. A primary goal of colleges of pharmacy should be the development of strategies for integrating and building upon these perspectives and skills from the liberal arts within the professional education of each pharmacy student. (3-5)

These frequent, insistent proposals sometimes have been met with misunderstanding and even alarm. Unfortunately the term ''liberal education'' conjures up for some pharmacy faculty and students images and associations that are so alienating that the recommendations are perfunctorily dismissed as a distraction from the real business of professional education. But what is being proposed here is not the inclusion of a new content or intrusive body of knowledge but a new orientation toward learning. The goal of such an integration of general and professional outcomes is to produce a curriculum and related teaching strategies and assessments that require students to move beyond training (which enables them to solve problems whose solutions are known) to education (whereby they can solve problems whose solutions are

not known or can identify problems and questions which were not seen before) (6).[2]

This difference between training and education is what motivates the question asked of pharmacy educators by Linda Salamon as she challenges them to extend their educational goals beyond technical competence: ''Do you teach students not facts but the power to establish facts, to bring them together as evidence, to probe the apparent results, to let imagination and even intuition play over them'' (7)? Providing not facts but the power to establish and test facts–this is the goal of education. Such a cognitive/constructivist educational model necessitates significant innovation, as recognized by AACP President Robert E. Smith in his 1999 inaugural address: ''Maintaining a pharmaceutical content paradigm and trying harder to integrate the general education outcomes into our curricula will not be successful. We have to create a new curriculum that truly integrates professional education with the general education outcomes'' (8, 9).

Problem-based learning, case studies, simulations, active learning, early experiential activities, service learning, assessment as learning, and ability-based assessment are among the educational strategies with which colleges of pharmacy around the country are experimenting in efforts to create this new curriculum. Not surprisingly, many of these strategies are likely to entail some component of writing in the preparation or presentation stages, for writing is a particularly powerful tool for learning. Many educators have found that if they want to learn a subject, the best method is to teach it and the next best method is to write an article about it. If the goal is for students to gain proficiency in problem solving, critical thinking, communication, and ethical decision making within professional contexts, writing deserves a more prominent role in the education of future practitioners. This essay attempts to provide a rationale and some strategies for using writing as one means for integrating general and professional abilities. Writing can be a stepping stone toward the creation of a curricular paradigm that is content-rich but ability-centered.

WRITING CHARACTERISTICS AND GENERAL ABILITY OUTCOMES

Writing is a technology that does not merely convey our ideas but helps us to formulate them. Of course no magical transformations occur during the transcription of spoken words; simply writing things down does not enhance thinking. It is not the act of putting pen to paper that is the essence of writing. Rather, the transformative power of writing is in part connected to the different relationships that writing establishes with time and with the senses. Writ-

ing, when interiorized culturally and individually, can influence both what we think and how we think (10-11).

A brief reflection can support this. What are the possibilities of passing a therapeutics course if a student is not allowed to read, take notes, or in any way transcribe or record the lectures? How many people in pharmacy practice–students or professors–walk around with the contents of DiPiro in their heads? Obviously, writing is a tremendous aid to memory. Prior to the invention of writing, human knowledge was limited, mostly, to what could be retained in living human minds. In preliterate cultures people developed much more prodigious memories than most of us now, but not even they could memorize DiPiro, for obviously, without writing, the book (i.e., the body of knowledge) never could have been produced in the first place. Writing externalizes memory. It is not merely the amount of knowledge that we are talking about here but the complexity as well. Before writing, pharmacology and all other ''disciplines'' consisted of observation captured in formulaic phrasing, proverbs, tales, and other conventional forms to serve as *aides-memoire* (e.g., ''Desperate diseases must have desperate cures,'' ''Bitter pills may have blessed effects,'' ''*Similia similibus curantur*''–''Like cures like,'' ''Eat leeks in oile and ramsines in May, And all the year after physicians may play,'' ''Don't step over the pennyroyal, dear,'' ''If you would live forever, you must wash milk from your liver,'' ''Cider on beer, never fear; beer upon cider, makes a bad rider''). Writing enables the documented detailed observation, analytic thinking, and discursive practices that allow such oral tradition to develop into science. Historically, such characteristics of writing, and *a fortiori* of printing, have had such a tremendous impact on our thought and culture that even in this century of remarkable human achievements, it is not surprising that end-of-the-millennium pundits have identified the most influential discovery of the past thousand years to be a sixteenth century machine: the printing press.

Writing orients us differently toward our world. Spoken words (and in reality all words are spoken, since writing localizes not words but visual signs for words)–spoken words are ephemeral, sounds constantly going out of existence as they are spoken. In writing, on the other hand, words and ideas appear to be ''fixed,'' spatially available for detailed visual inspection. Unlike the auditor in a lecture, the reader can progress at his or her own pace, stop to reflect, reread a passage, start over, or skip to the end. Moreover, with writing a person can place two or more texts side by side for comparison, can underline or circle text, can write comments in a margin–entering into an imagined ''conversation'' with an author who may have been dead for many years. This externalization of knowledge and a resulting distancing of the knower from the known frees the mind from the onus of memory, making available additional psychic energy for more rigorous analysis.

''I hate writing because it makes you think.'' The student who uttered these words was on to something. Again, there are many types of writing and thinking, but discursive writing that is well done requires us to become engaged in more rigorous thinking than is usually necessary, or possible, in most ordinary conversations. The long pauses in the writing process as we stare at our computer screens are not simply a silent search for the right word or grammatical nuance but a groping for the right thought or the necessary evidence to support our claim. Fortunately, in speaking unaided by writing we normally are not required to announce a thesis, to organize our words around topic sentences, or to support our topic sentences with evidence and well-reasoned arguments. In some types of writing we are. Frequent writing (and reading) reinforces such thinking skills as generalization, division, and classification as we identify or formulate main points, subordinate supporting points, and order and arrange according to an emerging structure.

To write with authority, I need to be aware of and know how to find what others have said about my topic, to comprehend what they wrote, to paraphrase it, to analyze it, and to evaluate it. To be effective, I must provide detail and examples to support my claims, acknowledge when such evidence is partial or unavailable, understand the nature of evidence in my discipline, recognize the gaps in my thinking, probe my misconceptions, and modify my ideas in light of what I have discovered. Of course such processes could be incorporated into an oral presentation, but given how ingrained writing is in our scholarly enterprises, it is unlikely that such would occur without some preparation in writing.[3]

The temporal lag that writing grants between production and ''publication''–the ability to pause during the writing process, to reflect, to search, and to revise–distinguishes writing from speaking. The unscripted orator or conversationalist, pressured to ''perform'' before a live audience, is always constrained by ideas and memories currently in consciousness. In existential interactions, we do not have the opportunity to ''revise'' our statements or to freeze our audience while we seek additional thought or research. Everyone has experienced lying in bed at night remembering a verbal exchange during the day and imagining the retort or the suggestion he or she should have made. Writing, with the lapses of time that exist between event and utterance, allows for that *mot juste*, that precise example, or that witty retort we wish we had thought of.

The ''tax'' for such temporal freedom is a concomitant requirement to be more focused in writing, to be hypersensitive regarding unity, organization, and clarity. Without changes in audible tone, gestures, and other contextual clues to clarify meanings, writing requires us to be precise, to anticipate rather than respond to audience confusion, and to give an architectonic shape to our ideas. Conversation is replete with diversions, free associations, and

stream of consciousness wanderings–which is clear when we try to read transcriptions of conversations as in the infamous Watergate tapes, or on bad days, in our own lectures. Formal writing, on the other hand, downplays associative thought and directs us to stay focused and to be very precise in thought and language as we weave our words with the words of others who have commented on the same topic. As I sit at my desk, fleshing out this paragraph, it may take me 20 minutes or more to organize and write what I could have said, though not as precisely, in 20 seconds. And it is not uncommon to spend 40-80 hours writing an article that might take 20 minutes to read. Of course it can take as much time to prepare a 20-minute speech, but it is unlikely in a contemporary Western, literate culture that during the preparation no writing or note-taking would be employed. Writing helps us to ''keep'' a thought, to integrate it with other thoughts, to give our thinking a structure, and to determine what our thoughts are. At the end of sophisticated writing projects, we know, perhaps for the first time, what we think, what our position is. If we have not to some degree modified our initial hypothesis, have not to some extent changed or enlarged our viewpoint, we might wonder if the effort was worthwhile.

It may be obvious that writing can help students achieve communication and thinking general ability outcomes, but it also can be an educational tool for developing other general abilities such as self- and social awareness, ethical decision making, valuing, and social interaction.

Separated from the give-and-take world of live dialogue, the writer and reader become more ''distant'' from their subject matter and their context; composing alone, in the privacy of their own rooms, apart from an ongoing social interaction, writers are likely to be less emotionally and psychologically engaged, more able to focus on the idea itself and less on the context. Removed from face-to-face interpersonal dynamics, decontextualized from a specific time, place, and occasion, the writer and reader are encouraged to be less polemical and more objective and analytic than they might be in a rhetorical debate. Writing can stimulate reflection and analysis.

Writing can also help us to recognize and combat a confining egocentricity. Writing, paradoxically, is more private, in that usually when writing we seclude ourselves from others and withdraw into our own consciousness, but writing is also more public, for the results of our writing are not limited to an immediate time and precise place. In writing we expose ourselves and our thinking to all who might find the trace of our thoughts on the paper (or screen) in front of them. In light of these potentially distant and possibly not even yet born individuals, we must create both an audience and a context for our imagined dialogue. To do so we must move outside of our own thinking, to imagine their thoughts and feelings; to anticipate their goals, motivation, and prejudices; to play with multiple perspectives; to acknowledge our

biases; to bring our assumptions to consciousness. In the absence of verbal and gestural responses from our audience that would cue us regarding their degree of understanding or agreement or interest or assent, we must create for ourselves anticipatory feedback–we must project the possible responses to our words and revise accordingly. Once we get our ideas ''outside of ourselves'' on the page, we are in a better position to dissociate them from ourselves, to treat them more objectively.

WRITING TO LEARN

What I have written above can easily imply at least two misconceptions. First, writing is not inherently liberating or thought-provoking (just as philosophy does not always lead to wisdom nor theology to God). If not adequately prepared, students can respond even to meaningful assignments with ''cognitively immature organizational structures'' such as ''and then'' writing which provides merely a chronological presentation of facts, ''all about'' writing which presents an encyclopedic overview without real purpose, and ''data dump'' writing in which facts are randomly listed (12). And in fact, writing can discourage thinking. Some written assignments and tests, for instance, require students simply to repeat what was taught and memorized–without even comprehension, much less analysis or critique. The form and content of some writing can perpetuate stereotypes and stereotypical ways of thinking that can imprison rather than liberate, and of course written propaganda can intentionally deaden rather than encourage thought. Used, intentionally or unreflectively, as a social or ideological weapon, writing can be a form of oppression which privileges one race, gender, or social class and represses others. Excessive attention to mechanics and conventions during the writing process can stifle creativity and independent thinking.[4] Writing is a tool for exploration and clarification, but one must first learn how to use the tool and then desire to use it for the purpose of truth-seeking.

Secondly, I have been speaking as if all writing were one process. Just as there are many types of thinking, there are many types of writing and many purposes for writing, many or most of which occur outside the academy. Academic writing itself incorporates many genres, including essays, critiques, summaries, lab reports, journals, reflection papers, patient education pamphlets, drug information papers, chart notes, web page authoring, and a wide variety of writing-to-learn activities. Aside from genres, another way to categorize writing is based upon purpose. Two influential categories in the writing movement are expressive writing (informal writing that focuses on exploration of ideas, values, and relationships) and communicative or transformational writing (formal writing with an emphasis on conveying information to an audience).[5]

Traditionally, many writing-to-learn programs emphasize informal or ''expressive writing,'' writing whose primary purpose is not to communicate but to ''think out loud'' on paper to discover new ideas or relationships between old and new ideas. Such expressive writing is not intended primarily for public consumption or judgment. Released from authoritarian external pressures and the fear of making mistakes, the expressive writer can risk exploration of ideas. Such writing forms as journals, diaries, brainstorming, and free-writes allow students to make connections between what they are learning and their own life world–connections to their own mental constructs and values. In so doing, they begin to appropriate ownership of their knowledge and to recognize the temporal and conditional nature of knowledge production. Feminist critiques of science teaching and science writing, for instance, have applauded expressive, nontraditional writing as an antidote to the sexist and ethnocentric values and paradigms pervasive in the discipline (13-16).

Some writing-to-learn techniques are brief and informal, involving both expressive writing and ''short writes'' geared toward learning content or skill.[6] The minute (or five-minute) essay is an active learning strategy to engage students in the learning process. At the beginning of class the technique is used to focus students on the topic by having them summarize a reading assignment or the previous lecture or by having them write an answer to a question raised when class begins. To recapture student attention during a lecture, the instructor can ask students to write questions or comments about what is not clear, to solve a problem, or to exchange and critique notes taken during class. At the end of class the writing strategy can be used to have students identify the main points of the lecture; to find unresolved issues; or to connect what was learned to previous classes, personal experiences, or current events. Such short writes can be kept in student learning journals or can be transcribed onto $3'' \times 5''$ note cards that the instructor can pick up and assess.

Another writing strategy is for students to keep a diary or log in which they record observations and insights, conduct brainstorming, and establish connections between what they are now learning and their previous knowledge and experiences. A variation is the double-entry journal in which students record on one column of a page a summary of what they have read or experienced and then on a second, parallel column they write the questions, connections, and responses to what they have read and seen. Asking students to write test questions can stimulate them to find patterns in what they are learning and can encourage metacognition. Directed reading assignments pose a series of questions students must answer in writing as they read an article or chapter. These questions can steer students to find key points, require students to show that they have comprehended what they read, and possibly direct students to respond to the text either by analyzing or evaluat-

ing. Comprehension and analysis are promoted by a one-sentence summary in which students digest a reading selection into one sentence, perhaps using a predetermined format consisting of the questions of Who? Does what? To whom/what? When? Where? How? and Why? The primary motivation behind these strategies is not to improve students' writing abilities but to develop thinking skills and to master content.

In many of these cases the writing requires a kind of ''translation'' of course content; students must internalize the subject matter, integrate it with previous conceptions and misconceptions, relate it to their everyday experiences, and explain it in terms of analogies to persons unfamiliar with the topic. For instance, physics students who must explain the laws of acceleration to their younger siblings, using a pop fly in baseball as a topic, must extend their knowledge beyond rote memorization of some definitions or formulaic calculations. When they have finished writing, the knowledge is not simply layered in their brains as another stratum of data that will probably soon be eroded; rather, it has been ''absorbed'' into their thought processes, integrated with their past learning. It is not uncommon for college graduates after a number of years to forget even taking some college courses but to remember with vivid detail writing assignments they completed 20 or 30 years earlier.

EXPANDING THE CONCEPT OF WRITING TO LEARN

While writing can be a means for students to translate science into terms and concepts within their everyday experiences, to adapt scientific concepts to their own models of understandings and expectations, and to develop personal ownership of ideas, it is also important to widen and adapt the students' paradigms and thinking processes to those within science. Writing within traditional scientific genres may help to accomplish that. Each discipline has its own models, with the differences being more substantive than mere conventions or formatting. Learning to write in a discipline is a form of enculturation in which students learn the patterns of thinking, habitual models of organization, and values of that discipline.

Unfortunately, a too narrow understanding of writing to learn may have helped to precipitate controversies regarding writing to learn in the sciences. The need for students, particularly in the early years of education, to create and appropriate for themselves intellectual and emotional bridges to science and the desire to release women and minorities from a tyranny of thought associated with masculine, Western experiences, are both very strong arguments for expressive writing as a teaching tool. However, writing to learn is not limited to short, self-directed exploratory writing.

The debates over writing-to-learn approaches are complicated by shifting

terminology (17-19). First of all, pigeonholing writing into such categories as poetic, expressive, transactional, mechanical, etc., while obviously useful for analytic and pedagogical purposes, can oversimplify the complexity of writing and obscure the overlapping of categories in any one piece of writing. Too often terms slide into binary classifications: expressive writing or communicative/transactional/expository writing; articulation or communication; informal or formal writing; metacognitive/heuristic/epistemic writing or reportorial writing; knowledge-telling modes or knowledge transforming modes. Writing-to-learn pedagogy, of course, by definition, favors those approaches which are constructivist, heuristic, and metacognitive, those that make meaning rather than merely convey it. But that does not mean that all exploratory writing is private and informal or that all formal writing is only transactional.

Unfortunately, in the above dichotomies, communication sometimes is relegated to ''mere'' status. In this model, ''communicative'' writing is too quickly associated only with procedures for assessing students: students ''communicate'' to the instructor what they have been told and memorized. But this is an impoverished sense of what communication is–telling something to someone who already knows it for the purpose of judging whether the teller really knows it as well. Communication in writing normally is a much richer and more complex activity that entails identifying a purpose for communication and an audience to communicate with; analyzing that audience and trying on a different point of view; finding, selecting, arranging, and synthesizing ideas and arguments that will be convincing to that audience; identifying, critiquing, and employing interpretive frameworks; identifying one's own assumptions and prejudices; solving problems; and revising in light of new insights and discoveries. Transactional writing can be and often is information centered, with the purpose of clearly conveying facts, not analyzing or challenging them. This is not a trivial ability, for as quantum physicist Erwin Schrödinger stated, ''If you cannot–in the long run–tell everyone what you have been doing, your doing has been worthless''(20). But writing for an audience also can be problem-based, research-oriented, analytical, or argumentative, allowing the writer to undertake investigations that probably would not be attempted, or perhaps even be possible, without the writing project. If this is how communication is defined, it is more obvious that communicative writing is a very sophisticated method for writing to learn. It is concerned not merely with knowledge transmission but knowledge production, or as John Updike says, ''writing and rewriting are a constant search for what one is saying.''

There are more compelling arguments for the use of formal writing in the sciences. The connection of writing to science extends much deeper than writing's use as a pedagogical tool. In the introduction to Halliday and Martin's *Writing Science: Literacy and Discursive Power*, Alan Luke alludes to

historical, anthropological evidence that ''writing is the enabling technology for 'doing' modern science.'' While it might be more precise to state that print, more than just writing, was the fuel which fired the scientific revolution, worth pursuing is Luke's claim that the technicality and abstraction of modern science are not thinkable in the language of everyday life; thus it is ''naive pedagogy'' to think that effective science education can totally escape the language or jargon of science (11, 21, 22).

Once again, as several thinkers such as McLuhan, Ong, and Goody have shown, language does not merely represent reality but can also help to structure it. Likewise, the modes by which language is expressed (orality, writing, print, electronic technology) are not neutral, passive agents or inert ''media'' between the speaker/writer and listener/reader or between the knower and the known. Writing, for instance, is an internal technology that enables, and discourages, ways of thinking and ways of interacting with others. Along these lines, Halliday and Martin argue that the language of science does not simply mirror nature more rigorously or in closer detail than ordinary language; its lexogrammatical features, its vocabulary and grammar, actually facilitate the construction of categories that may be literally ''unthinkable'' in everyday language. ''The language of science is, by its nature, language in which theories are constructed; its special features are exactly those which make theoretical discourse possible'' (23). In short, substantive, systematic changes in lexicon grammar can influence changes in conceptualization. This is not to say that scientific language is the perfect, immutable symbol system in which language and reality correspond precisely. Scientific language and patterns of organization, like all language and patterns of organization, are social/ideological processes that select, valorize, and thematize; they expand and reveal at the same time they limit and distort. Students must recognize that science and the language of science are value-laden, socially constructed, and subject to continual evolution.[7] If students are to learn not just facts but the power to establish facts, learning to write within disciplinary genres and formats can be an enabling step. They must first understand the language regardless of whether they seek to perpetuate or change it. The truth will set you free.

Thus ''writing to learn'' can refer to short, writer-centered, mostly ungraded writing assignments that encourage students to explore a subject and their reactions to it without much attention to conventions or audience. But it is a mistake to think that writing assignments that are audience-directed and more disciplined do not encourage students to learn from their writing. Both types of writing have advantages, and within a well-planned curriculum there can be a stepwise progression in which expressive writing is used to ''scaffold'' to more formal assignments within traditional scientific disciplines, such as experiment, explanation, report, biography, and exposition (19). In

that way, students can come to understand facts and ideas in terms of their existing conceptual frameworks. Then they can gradually adapt their patterns of language and thinking to the frameworks of their disciplines. Through increasingly sophisticated writing projects, students will come to see better how knowledge in their disciplines is created, assessed, and modified. They are more likely to become educated rather than trained.

And in fact, writing assignments can be constructed to address all the thinking levels listed in Bloom's taxonomy. At the lowest level, writing assignments can be used to evaluate whether students have retained information. Moving up, many of the writing assignments described above are successful in helping students comprehend subject matter because they require students to paraphrase for a ''lay'' audience such disciplinary concepts as bioavailability, metabolism, photosynthesis, resonance, or capitation. Now students cannot simply repeat terms and explanations which they do not understand, as they might on a written exam where recall rather than comprehension is being tested. Other writing assignments require students to apply their knowledge. Examples are writing background and other explanatory material to put into perspective chemistry-related articles appearing in newspapers or applying the theory of utilitarianism to an ethical dilemma regarding a conflict between the principle of confidentiality and concern for the public good. As we have seen, writing promotes analysis; if students were not required to write an analysis/discussion section of a lab report or technical paper, it is questionable whether they would ever understand as clearly and precisely what occurred during the experiment. Some writing assignments challenge students to synthesize, as in physiology when students are asked to invent and explain a pheromone. In evaluative essays students use compelling evidence to make insightful judgments regarding the value, correctness, or desirability of an idea or action, such as the practice of third-party payments, legalization of pharmacist prescribing, the efficacy and safety of complimentary and alternative medicines, roles for pharmacy technicians, or issues in mail and Internet dispensing.

The literature is replete with claims of the efficacy of using writing to develop disciplinary thinking.[8] Students in math classes work in learning groups to express in writing their conceptual understanding of calculus, with the result that both their cognitive abilities and their attitudes toward learning improve (24). A study of writing projects in second semester chemistry determined that ''the completion of frequent critical-thinking writing assignments is a more effective way to learn chemical concepts than traditional drill-type exercises,'' and similar conclusions have been reached regarding the efficacy of writing to learn in organic chemistry (25, 26). In a statistics class, students outperformed a control group when they wrote jargon-free press releases about the statistical problems they were investigating (27).

Students in biology who had frequent writing assignments integrated into their course were better able to understand biology and to evaluate data, with 60% of those students making ''significantly higher grades in . . . subsequent classes than did comparable students who did not take the course'' (28). Within nursing, writing is used as a method to develop critical thinking to enable practitioners to ''select appropriate information and defend its integration into patient care'' (29, 30). And in pharmacy, students enrolled in a section of verbal communication that employed language-for-learning (LAF) techniques showed improvement in writing skills, ability to formulate ideas, and ability to identify appropriate target audiences, whereas students in a control section did not (31-33).

PHARMACY APPLICATIONS

Applications to pharmacy education are unlimited. Every class, regardless of size or content, can employ writing-to-learn techniques that promote active learning–short writes, minute essays, directed readings, etc. Longer assignments are also excellent teaching tools in every area of pharmacy. Patient information pamphlets (and now videos with written scripts) require students to understand complicated information so that they can explain it in lay terms. With the growth of on-line pharmacies, a valuable writing assignment is to have students provide clear and accurate electronic responses to simulated patient queries provided over the Internet. Herbal products and alternative therapies provide opportunities for integrating general and professional abilities through writing. The problem patients have with herbal medicines is not insufficient information but an overabundance of it, much of it unsubstantiated or patently wrong. A writing assignment that requires students first to analyze herbal advertising and scientific data relating to herbal medicines and then to write monographs for patient education is an exercise not only in communication but also in analysis and evaluation, an exercise that will prepare students to counsel and educate patients (34). Clearly, accurately, and completely documenting drug therapy assessment and recommendations in the medical records can help to develop pharmacist accountability and professional credibility in a collaborative primary care practice. Teaching pharmacy students to write chart notes can be a useful way to evaluate their professional abilities to assess and recommend drug therapies (35).

Journals exploit the expressive function of writing. For instance, within pharmacy education and elsewhere, service learning has been heralded as an excellent opportunity for students to explore their assumptions, values, prejudices, social/civic responsibilities, and the meaning of their professional commitment to pharmaceutical care.[9] By performing volunteer work with underserved populations and individuals in need, students accumulate experi-

ences that encourage intellectual, emotional, and professional growth. Once again, writing can be the catalyst for insightful reflection. Often in service learning, students make weekly entries in a journal to distill their volunteer experiences and to reach insightful conclusions. Usually instructors who read the journals are less concerned with grammar and structure because the primary purpose of the journals is not to communicate objectively and convincingly with a wide audience but to use writing to discover what students think and feel and believe. This does not mean, of course, that journal writing is ''ungradable'' fluff. Specific criteria for the entries can be established, for instance: the writer should objectively observe and describe what took place; explain his or her subjective responses to what happened; analyze the volunteering experiences to find patterns, explanations, causes; evaluate both what took place and the writer's responses to what happened; and devise plans for enhanced performance at the next volunteer opportunity. Such criteria have prospective as well as retrospective benefit, for knowing that they will need to fulfill the criteria in their next journal entries, students at their sites become more observant regarding events and environment, more alert and inquisitive, more attentive to what can be changed to improve their performance and the well-being of their patients/clients. Because of the need to reflect in writing upon their experiences, the students are ''predisposed'' to learning when they enter their sites. The journal entry then provides the opportunity to sift through their sensory experiences, their emotional responses, and their thoughts to better understand themselves, those they work with, and the nature of their profession. If pharmaceutical care requires not only ''caring for'' patients but also ''caring about'' them, such expressive writing should be incorporated into a number of courses throughout the curriculum.[10]

Disease monographs for health care collaborators provide opportunities for students to learn and remember content as they experiment with adapting communication to different audiences. Drug information papers teach students not only content but also critical analysis and scientific thinking. Argumentative essays extend the knowledge and thinking skills of students as they explore the background and find evidence to support positions on such topics as the nature of pharmaceutical care, the appropriate uses of Ritalin®, ethical issues in pharmacy practice, or compensation for cognitive services. Analytic memos are problem-solving simulations in which students write concise plans to address, for instance, a problem arising in a pharmacy or nursing home. Or students can write essays to propose strategies to increase patient compliance regarding specific drugs and disease states. Of course, having students write both cases and solutions to cases allows them to practice problem-solving strategies. Problem solving can also be encouraged by having students write business plans. Requiring students to keep journals during rotations can help them and their preceptors to monitor cognitive and attitudi-

nal development. In pharmacy and other professions, it will be important to instruct students on ''writing'' within an electronic environment using new conventions, formats, and genres associated with e-mail, bulletin boards, web page production, and on-line presentations.

In these writing assignments, learning is enhanced if students rewrite. Writing is recursive. It instantiates the hermeneutical circle: how can we know the whole until we understand the parts, but how can we understand the parts until we know the whole? Revision is one strategy: make an attempt to create a structure based upon what is known, ''resee'' what is known in light of that structure, modify the structure in light of what has been reseen, and repeat the process. As opposed to editing, which is oriented more toward conventions, revision is a process of rethinking the writing assignment. Assessment can be a catalyst for such rethinking. If students are given clear criteria at the time the assignment is given, they can self-assess their work before they turn it in. For more objective feedback, peers can assess according to the same criteria, with an advantage being that the peers come to a better understanding of what constitutes successful performance through specific examples. In marking papers, instructors can point out problems, challenge ideas, and suggest new lines of thinking; however, if the student is not required to rewrite the essay, it is unlikely that he or she will benefit much from such comments, regardless of how perceptive and detailed they are. It is in the revision that the student must wrestle with the instructor's comments, modify frameworks, extend thinking, and come to a more accurate and complete understanding. Formative assessment provides the dialogue that encourages the student to discover what he or she is saying.[11]

CONCLUSIONS

''Writing'' in professional education does not refer to one activity or practice. A variety of writing activities can be adopted to achieve a variety of educational outcomes for students at varying points in their cognitive and affective development. Instructors can create writing assignments to encourage students to investigate and to appropriate content; to demonstrate comprehension; to develop analytical skills; to explore self and values; to interrelate disparate ideas; to synthesize; to develop disciplinary thinking; to understand audience; to argue using clear and compelling arguments; and to perform professional abilities such as recommend drug therapies, educate and counsel patients, or collaborate with other health care professionals.

Although the dawning of an information age will put new demands on the communication abilities of pharmacists, it is a mistake to base the commitment to writing in pharmacy education solely upon the quantity and types of writing that are performed in professional practice. Of course students should

learn to write clearly and effectively in the genres and formats they will be required to use as practitioners, but the primary purpose for incorporating writing throughout the curriculum is to help to educate, rather than merely train, professionals who provide pharmaceutical care. Such professionals will understand how knowledge is constructed, will be self-aware and oriented toward others, will be problem solvers who can find, understand, analyze, synthesize, evaluate, and communicate information. In other words, writing as a way of learning is an example of how the integration of general and professional ability outcomes can help to produce the type of professional described in Background Paper II and in other professional association reports: ''Our graduates need to be more than just professional problem solvers who come in, recite the solution, and leave like technological mercenaries. They must not only solve problems, but frame them'' (6).

Impracticalities, of course, abound in trying to incorporate significant writing into most pharmacy courses–class sizes, available time of both instructors and students, lack of instructor ability and/or comfort and/or desire in designing and assessing writing assignments. Some solutions exist. Faculty development programs can demonstrate the efficacy of writing as a teaching tool, can teach the use of rubrics in assessing writing, and can provide strategies for assessment as learning. Writing centers at most universities can provide ideas for creating and assessing writing assignments and can support the instructor with direct assistance to students. Curriculum committees can propose across-the-curriculum plans for teaching and assessing writing and can propose required writing emphasis courses in which students frequently practice writing and rewriting to learn a subject matter.[12]

However, such efforts alone probably will not be sufficient because ''curricular reform'' extends beyond tacking writing onto existing courses which continue to constitute a content-centered curriculum. The addition of meaningful writing assignments into a curriculum can assist in a reconceptualization of what the purpose of education is within a pharmacy program. Using a cognitive/constructivist educational model, faculty can devise curricula and courses that integrate general and professional abilities to enable students to learn not just facts but the power to establish facts, to not only know the solutions for existing problems but to achieve the ability to solve problems that have not yet presented themselves. Writing is itself a communication ability useful for any professional, but it is also a very effective teaching tool to educate practitioners in ways that will help them to develop the abilities to provide pharmaceutical care.

RECEIVED: 01/13/00
REVIEWED: 02/07/00
REVISED: 02/21/00
ACCEPTED: 02/22/00

NOTES

1. The dynamic relationship between thought and language is extremely complex and controversial. The perspective taken here is related to: Vygotsky LS. Thought and language. Hanfmann E, Vakar G, eds. and transl. Cambridge: MIT Press; 1965.

2. For an argument for the affinity between liberal and professional education, see: Shulman LS. Professing the liberal arts. In: Education and democracy: re-imagining liberal learning in America. Orrill R, ed. New York: The College Board; 1997:151-74.

3. Although, following the lead of Ernest L. Boyer, the definition of scholarship in higher education has been expanded, normally, still, scholarly activity must include reflection, dissemination, and assessment, all of which most commonly take place in the form of writing. See: Boyer EL. Scholarship reconsidered: priorities of the professoriate. Princeton: Carnegie Foundation for the Advancement of Teaching; 1991; and Zlatic TD. ''Whoa–why did I say I'd do this?'' Some thoughts on humanities scholarship in pharmacy education. Am J Pharm Educ 1992;56:417-21.

4. In fact, many writing instructors themselves have downplayed or even abandoned mechanics and grammar, sometimes to ''liberate'' students from confining conventions and sometimes denouncing this fixation with grammatical ''correctness'' as ideological manifestations of racism, sexism, and classism.

5. For background on the writing-to-learn movement, see: Britton J. Language and learning. New York: Penguin Books; 1970; Emig J. Writing as a mode of learning. Coll Composition Communication 1977;28(2):122-8; Fulwiler T. Teaching with writing. Portsmouth, NH: Boynton/Cook Publishers; 1987. For a ''brief history of writing to learn in the content areas,'' see Keys (Ref. 19).

6. For examples, see: Strauss M, Fulwiler T. Writing to learn in large lecture classes. J Sci Teach 1989/90;13(3):158-63; Angelo TM, Cross KP. Classroom assessment techniques: a handbook for college teachers. 2nd ed. San Francisco: Jossey-Bass; 1993; Bean (Ref. 12); Hobson E, Schafermeyer KW. Writing and critical thinking: writing-to-learn in large classes. Am J Pharm Educ 1994;58:423-7.

7. The emergence of electronic communications technology and its potential implications for human thought and expression provide for tantalizing speculations regarding the evolution of writing and research in the upcoming century. Just as the printing press contributed to the development of scientific thinking and language, electronic communication technology will likely influence new patterns of thought and writing. For some preliminary analyses, see: Heim M. Electric language: a philosophical study of word processing. New Haven and London: Yale University Press; 1987; Bolter JD. Writing space: the computer, hypertext, and the history of writing. Hillsdale, NJ: Lawrence Erlbaum; 1991; Lanham RA. The electronic word: democracy, technology, and the arts. Chicago: University of Chicago Press; 1993; Welch KE. Electric rhetoric: classical rhetoric, oralism, and a new literacy. Cambridge and London: MIT Press; 1999.

8. For an overview in the sciences, see Rivard (17). Examples of general strategies for writing in the sciences can be found in: Glynn SM, Muth KD. Reading and writing to learn science: achieving scientific literacy. J Res Sci Teaching 1994; 31:1057-73. For a more tempered result, see: Schumacher GM, Gradwohl J. Con-

ceptualizing and measuring knowledge change due to writing. Res Teaching English 1991;25(1):67-96.

9. For service learning within pharmacy, see: Nickman NA. (Re-)learning to care: use of service-learning as an early professionalization experience. Am J Pharm Educ 1998;62:380-7.

10. Two examples of expressive writing from the medical literature are: Poirier S, Ahrens WR, Brauner DJ. Songs of innocence and experience: student's poems about their medical education. Acad Med 1998;73:473-8; Deloney LA, Carey MJ, Geeman HG. Using electronic journal writing to foster reflection and provide feedback in an introduction to clinical medicine. Acad Med 1998;73:574-5.

11. For a description of writing within an ability-based educational approach, see: Zlatic TD. Ability-based assessment within pharmacy education: preparing students for practice of pharmaceutical care. J Pharm Teach 2000;7(3/4):5-27.

12. Writing emphasis or writing intensive courses employ writing to learn principles and strategies for students to learn a subject matter. Usually such a course requires a minimum number of written pages (often 20-40 pages), a number of different writing assignments (often 3 to 6), and the rewriting of 2 or 3 of those assignments after receiving feedback from self, peers, and instructor. For the efficacy of such a writing emphasis course in pharmacy, see: Ranelli P, Nelson JV. Assessing writing perceptions and practices of pharmacy students. Am J Pharm Educ 1998; 62:426-32.

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