Use of writing portfolios for interdisciplinary assessment of critical thinking outcomes of nursing students

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Abstract:
This article discusses an interdisciplinary research project in which faculty from nursing and english collaborated in the assessment of students' critical thinking skills as reflected in writing portfolios. Faculty reviewed students' writing portfolios and then corresponded on email from two different universities about evidence of critical thinking in the portfolios. Findings suggest that writing portfolios can provide important evidence of critical thinking outcomes. To do this, however, faculty need to design writing assignments to foster critical thinking skills, helping students to think not only about learning to write, but also about using writing to learn.

Nurse educators are increasingly aware of the need for students to develop critical thinking skills to apply in today's complex healthcare environment. This need, supported by the National League for Nursing Accrediting Commission (NLNAC) and other accrediting agencies, is reflected in the growing number of articles in the nursing literature related to strategies for enhancing students' critical thinking skills (Baker, 1996; Beeken, Dale, Enos, & Yarbrough, 1997; Facione & Facione, 1996; Koch & Speers, 1997; Parse, 1996; Tanner, 1996).

It is important, however, for nurse educators not only to foster the development of critical thinking skills, but also to determine effective ways to assess them as outcomes (Parse, 1996; Rane-Szostak & Robertson, 1996). This process of assessment and documentation of critical thinking outcomes has received little emphasis in nursing literature (Colucciello, 1997; Dexter et al., 1997; van der Vleuten & Newble, 1995). The use of standardized instruments such as the California Critical Thinking Test or the Watson-Glasser Critical Thinking Test (O'Sullivan, Blevins-Stephens, Smith, & Vaughan-Wrobel, 1997) is not always desirable. Although some programs have explored the use of student writing portfolios as a means of assessing learning outcomes related to critical thinking (Cayne, 1995; Cleary, 1993; Facione & Facione, 1996; Jensen & Saylor, 1994; Lashley & Wittstadt, 1993; O'Sullivan, Blevins-Stephens, Smith, & Vaughan-Wrobel, 1997; Rane-Syostak, 1996; Ryan & Carlton, 1997), little formal research of this method has been done in nursing.

This article describes a collaborative research project between faculty at two large state universities and two disciplines -- nursing and English - to assess the effectiveness of writing portfolios in providing evidence of nursing students' critical thinking skills. Data reported here

are part of a larger study focusing on how both written communication and critical thinking skills are assessed as outcomes in writing portfolios. This article, however, focuses only on the outcomes related to critical thinking.

Framework for Study

This study was conceptualized within a Writing to Learn framework that was first suggested by Emig (1983) in her research on the composing processes of high school students. Emig concluded that in the process of writing, connections are made between the hand, eye, and brain that can lead to new insights and facilitate learning. Other researchers in composition have expanded our understanding of the thinking processes inherent in the process of writing, so that writing becomes a valuable tool for learning, as well as for communication (Fulwiler, 1982; Howard & Barton, 1986; Thaiss, 1991; Young, 1997). Thus, teachers in all disciplines may need to view writing not only as a finished product with appropriate style, grammar, and spelling, but also as a process that can help students to make important connections between ideas.

Research in composition has provided insights for educators into use of the writing process as a teaching strategy for helping students to think critically Thus, educators should focus not only on helping students learn to write, but also on using writing to learn. Beyer (1987) stated that in the critical thinking process, a student should show evidence of the ability to: 1) translate data, 2) classify it and compare it to other data, and 3) infer a generalization about the unique feature(s) of a particular subject or phenomenon.

Unfortunately, written assignments for students often are not designed to reflect the critical thinking process. Beyer (1987) pointed out that most forms of testing and assignments, even essays, are designed to assess students' learning of the subject matter, not to assess critical thinking skills. Assignments often are evaluated on information given as evidence to support a claim (including the kinds, amounts, accuracy, and relevance of this information), the number and kinds of sources cited, and the number and accuracy of the specific facts given. These evaluation criteria do not reflect an awareness of critical thinking processes. Instead, they send a message to students that it is the final product that is important -- facts and generalizations -- rather than the process of thinking they should use in arriving at conclusions.

Britton (1975) noted in his research that most writing that students do in the classroom is formal and scientific, a type of writing he termed transactional. A reliance on transactional writing shows limited understanding of how language relates to the thinking process. Britton noted the need for students to explore expressive writing, which is a type of writing often written to oneself or to a trusted person, such as in diaries, journals, letters, or first-draft papers. Fulwiler (1982) described expressive writing as the type of writing that is most personal and closest to the thinking process itself. Research has demonstrated that expressive writing is crucial for trying out and coming to terms with new ideas (Baker, 1996; Britton; Thaiss, 1991; Young, 1997).

In summary, if writing assignments are to be used as evidence of critical thinking, it is important that assignments are designed not only to help students "learn to write" but also to help them "write to learn." The process of writing offers an important opportunity for students to connect ideas from internal and external sources, critically think about the ideas, and then infer a generalization that gives the separate pieces of information a coherent verbal shape. It was this

conceptualization of writing as a complex process (not product) that led the researchers to study how writing portfolios could be used to provide evidence that students were using critical thinking in their learning about nursing. Thus, the question for this research study was: How are nursing students' critical thinking skills reflected as outcomes in writing portfolios?

Methods

To answer the research question, two nursing professors and one English professor at each of two universities (six professors) collaborated in the assessment of writing portfolios. Both English professors had considerable experience in assessment of student portfolios, whereas nursing faculty had limited experience in this activity. Each of the six professors read and evaluated eight students' portfolios for evidence of critical thinking outcomes and then participated in a two week e-mail dialogue about their assessment process and findings. Because researchers were interested in the types of written assignments and evidence of critical thinking at both the undergraduate and graduate levels, portfolios of two undergraduate and two graduate nursing students at each of the two universities were assessed.

Sample and Data Collection

One researcher at each of the two universities asked nursing faculty to recommend students who were good, but not necessarily outstanding writers; the first four students recommended at each university were selected as participants. The study was approved by appropriate university research committees and each student was asked to sign an informed consent before participating in the study Students were offered a choice of a book or a small monetary honorarium in appreciation for their participation in the study

Each student was asked to select four pieces of writing from cumulative nursing classroom or clinical assignments that demonstrated critical thinking skills. Critical thinking skills were purposely not defined for the students, so that in the selection of writing assignments, they would be free to apply their own assumptions related to what constituted critical thinking. No restrictions were placed on the number of assignments that could be selected from a specific nursing course.

In using writing to document outcomes related to critical thinking, Facione and Facione (1996) suggest that the writing should provide evidence related to the process of thought, as well as to synthesis of thought. Therefore, in an attempt to shed light on the thinking process engaged in by students in this study, each student was asked to write a reflective essay, writing for one hour to reflect on how the selected pieces demonstrated critical thinking skills. The portfolio was comprised of the reflective essay and the four pieces of writing.

Copies of the eight portfolios, along with the Critical Thinking Skills Evaluation Instrument (Table 1), were given to each of the six participating professors. This instrument, developed by nursing faculty at the University of North Carolina at Greensboro, was used previously to evaluate outcomes related to critical thinking in graduate students, with interrater reliability established at 95% (Kohlenberg, 1995). For this study, professors reviewed the eight portfolios and rated each student's critical thinking skills along the five-point Likert scale for each of the five categories on the instrument. Then, a two-week e-mail dialogue among the professors was held. After completion of the dialogue, comments were printed out for analysis.

Data Analysis

Quantitative and/or qualitative data for analysis came from three sources: (1) the Critical Thinking Skills Evaluation Instrument; (2) writing portfolios; and (3) the e-mail dialogue. Scores and comments related to outcomes identified from the Critical Thinking Skills Evaluation Instrument were summarized. Content analysis of students' reflective essays in the writing portfolios was carried out to identify students' perceptions of how critical thinking outcomes were reflected in their writing. Also, the various types of assignments selected by the students for inclusion in the portfolio were categorized. Finally, qualitative data from the e-mail dialogue about writings in the portfolio were summarized to identify professors' perceptions of how the portfolios reflected critical thinking outcomes for the students.

Table 1. UNCG Critical Thinking Skills Evaluation Instrument

Student Name or ID _____

Evaluator _____

Date _____

Rating Scale:
5 = Functions independently
4 = Requires minimal guidance
3 = Requires occasional guidance
2 = Requires consistent guidance
1 = Cannot perform even with guidance

1. *Ability to analyze and interpret.* Seen when the student identifies steps followed to complete project, suggests contemporary significance of historical events, describes symbolism in a practice, identifies an argument's assumptions, or identifies the reasons used to support a claim.	1	2	3	4	5
2. *Draws logical inferences.* Seen when student decides what data need to be gathered to confirm or disconfirm an hypothesis, decides on a plausible course of action, applies a statistical test, or determines the precise implications of a set of premises.	1	2	3	4	5
3. *Evaluates and justifies inferences.* Seen when student decides facts based on evidence or testimony, explains rational bases used in coming to a decision, considers the reasons for and against a point of view, justifies the choice of a given procedure, or determines the applicability of a given set of criteria.	1	2	3	4	5
4. *Deductive reasoning.* Seen when student draws instances from generalizations or inferences from transitivity, reflexivity, or identity.	1	2	3	4	5
5. *Inductive reasoning.* Seen when student bases inferences on statistics, precedents, paradigm examples, analogies.	1	2	3	4	5

Based on the 1990 Delphi Report, *Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction,* (ERIC Doc No: 315423).

Findings and Discussion

Findings and discussion related to the three sources of data are presented here. First, findings related to the Critical Thinking Skills Evaluation Instrument are presented, followed by results of content analysis of the writing in the portfolios. Findings and discussion from analysis of the e-mail dialogue related to critical thinking outcomes conclude this section.

Critical Thinking Skills Evaluation Instrument

Each professor used the Critical Thinking Skills Evaluation Instrument to score each portfolio in five categories of critical thinking outcomes: 1) ability to analyze and interpret; 2) draw logical inferences; 3) evaluate and justify inferences; 4) deductive reasoning; and 5) inductive reasoning. One professor's tabulation of scores was lost in the mail, so analysis is based on five professors' tabulations. Cumulative scores for four of the categories on the form (ability to analyze and interpret, draw logical inferences, evaluate and justify inferences, and inductive reasoning) were fairly consistent, with scores ranging from approximately 3.8 to 4.5. The category with the least consistency in cumulative scores among evaluators was that for deductive reasoning; scores for this category ranged from 2.7 to 4.3. Although the numerical scores for the categories might differ among evaluators, there was consistency in the direction of the scores, in that a category for a particular student tended to be rated high or low by each evaluator. Cumulative scores for critical thinking were lowest for categories of "evaluates and justifies inferences," "deductive reasoning," and "inductive reasoning." Cumulative scores for graduate students did not appear to differ significantly from those for undergraduate students.

Comments from professors evaluating the portfolios reflected the difficulty of using the instrument to evaluate critical thinking in the writing samples without knowing the context or goals of the assignments. One professor suggested the need to add a category about "conceptualization." Overall, the researchers concluded that in the context of this study, the Critical Thinking Skills Evaluation Instrument was not adequate to assess outcomes related to critical thinking. This finding differs from conclusions arrived at by nursing professors who previously used the instrument with graduate students (Kohlenberg, 1995). In that context, the Critical Thinking Skills Evaluation Instrument was completed by professors who guided students' theses or graduate projects. Thus, the professors already knew the students' previous work and had more evidence to consider than that provided by the writing portfolios in this study It appears that different types of writing assignments, or a larger variety of writing, may be needed in a portfolio to provide a context in which the Critical Thinking Skills Evaluation Instrument could better reflect critical thinking outcomes.

Analysis of Students' Reflective Essays

Various articles in nursing literature have addressed how learning is enhanced through reflecting in writing about the thinking process (Baker, 1996; Cayne, 1995; Ryan & Carlton, 1997). The reflective essays included in the writing portfolios for this study provided insights into how students conceptualized outcomes of the critical thinking process. Although all eight participating students were asked to write a one-hour essay on how their selected writing reflected critical thinking, one student did not submit a reflection with her writing samples, so that only seven reflective essays were analyzed. Two of the researchers independently read the approximately 500-word reflective essays to: 1) identify phrases or sentences that characterized students' perceptions of the critical thinking process and 2) categorize the types of writing assignments selected by the students as representative of critical thinking. Each of the two researchers then independently wrote two to three pages related to the two parts of the analysis and, afterward, discussed their interpretations until arriving at a consensus. Hypothetical names were assigned to each student and verbatim quotes from each student were then used to shape the overall descriptions for the two parts of the analysis.

Students' perceptions of the critical thinking process. After identifying unique phrases or sentences that characterized each student's perceptions of the critical thinking process, the two researchers selected characteristic quotes from undergraduate and graduate students' writings to form an overall description of their perceptions of critical thinking. Two themes emerged from data analysis of both undergraduate and graduate students' reflective essays: 1) that critical thinking involved "seeing" in a special way and 2) that it included not only such components as analysis and synthesis, but also a creative process.

When looking across the reflective essays, it was evident that almost all the students created images related to "seeing" to describe their overall perceptions of critical thinking. Jane, a graduate student, characterized critical thinking as "the big picture" and "seeing the forest for the trees." Helen, an undergraduate student, expressed the need to "examine closely" with "careful attention to every aspect of the subject matter." Another undergraduate student, Juanita, described critical thinking as "being able to see more than just what is on the surface." She also noted the satisfaction that can come with this type of thinking:

As I investigate and develop one idea, more will grow from the original, and I end up putting the pieces together like a puzzle. Sometimes I am surprised myself at how beautifully the pieces fit and I feel quite rewarded.

Roberta, also an undergraduate, wrote about how she uses critical thinking to see something in a new light:

As I look back at these papers I have written, I can see evidence of how I have taken specific data and brought it out into a bright light, so as to work to solve a problem, implement an idea, provide suggestions, or learn from my own mistakes.

Students described the importance of applying this special way of seeing to their practice. Jane noted the practical aspects of applying critical thinking to nursing practice:

Critical thinking, which is a practical skill, carefully explores a situation or issue and provides support with reason and evidence.

Sara, a graduate student, noted that sometimes the insights that occur when nurses engage in critical thinking related to their nursing practice can create risks:

Sometimes critical thinking does not occur in practice because we are so comfortable doing things the same old way. It would be risky to look at our practice using critical thinking. Developing critical thinking skills allows nurses to challenge old practice methodologies.

A second theme emerging from analysis of the reflective essays was the importance of creativity in the critical thinking process. Although many textbook definitions of critical thinking emphasize the "left brain" analytic components, students in this study emphasized creative aspects. Jane noted that:

Critical thinking uses the whole brain: Left side involves systematic decision-making and problemsolving; right side involves creativity, reframing problems, and generating solutions.

An undergraduate student, Margaret, echoed this perspective:

I believe the more creative an individual gets, the more critical thinking will be demonstrated. Juanita wrote about how she attends workshops and seminars to develop her creativity and how before writing anything, "a paper, essay, or letter," she carefully reflects on what she wants to convey and then tries to "make it come to life:"

The more simply an idea can be stated, the better. . . It would be a shame to lose the readers before they are halfway through your work. Even with a subject that seems dull, the writer has the power to make it come to life.

Assignments related to critical thinking. Students (except Juanita) related their perceptions of critical thinking directly to the assignments that they selected for inclusion in their writing portfolios. The two researchers found that categories of assignments were not mutually exclusive; therefore, they determined by consensus which category best characterized a written assignment. The written assignments included, among others, professional issue papers, research papers, theory papers, clinical papers and journals, critiques, and paradigm cases.

There appeared to be differences between the types of assignments included in the writing portfolios of undergraduate and graduate students. Some of the papers in the portfolios of the graduate students, such as theory and concept analysis papers, appeared more "conceptual" than those in the undergraduate students' portfolios. Researchers were unable to tell whether this was a reflection of the type of papers assigned at the two levels or merely a personal preference of the students. The seven students now "speak" to us, through excerpts from their reflective essays, about their perceptions of how critical thinking outcomes are reflected in specific writing assignments.

One type of professional issue paper took the form of a political letter. Sara, a master's student, reflected upon the critical thinking she used in writing her letter:

I have taken a stand on an issue which presents a problem to practice, backed up my statement with factual information and communicated my position to someone who may act on this information.

Sara also addressed issues related to advanced practice and critical thinking:

The advanced practice. . . [paper] relates to the application of critical thinking skills because it encompassed not only what I had been doing in the past but what I wanted to take from my experience at [this university] and utilize in my future. This was my last attempt to "test the waters" in a safe environment.

Another avenue for students to reflect upon critical thinking outcomes comprised research and theory papers. Helen, a baccalaureate student, wrote about her research paper:

Strict observance of APA format and source citation are integrated with an extensive literature review. Historical background studies, summation of significant findings, and appropriate recommendations grounded in logical reasoning are presented.

Jane reflected on a theory assignment as it related to developmental theories and her daughter: In my daughter's adolescent development term paper, I explored developmental theories and applied them to my daughter's behavior and situation. This writing was a challenge because I was personally close to the subject. I wrote in the third person and tried to be objective in my observations. And I focused on the "big picture," presenting a 17-year-old adolescent at the threshold of high school graduation and how she "fit" into educational and developmental theories.

Clinical papers and journals composed another category of written assignment. Mary and Roberta, both baccalaureate students, reflected on the critical thinking embedded in clinical experiences. Mary's paper focused on the elderly and nutrition:

I took an holistic approach. I had to analyze as many aspects of elderly lives as possible in order to address their nutritional concerns. I took into account finances, living environments, and accessibility to proper nutrition ....

Roberta wrote about her clinical experience in Nicaragua. In her reflective essay, she wrote:

Throughout the paper I discussed various nursing characteristics such as flexibility, prioritizing, and adjusting to providing care with what is available.

Jane reflected on the critical thinking found in her clinical journal:

Especially in my clinical journal I tried to describe situations that were new to me, and find research articles which would teach me more about unfamiliar problems. . . The clinical journal shows selfreflection and evaluation of each clinical experience and related research article.

The critique was another type of assignment mentioned by the students. Margaret notes:

Having to process and critique situations and to fit them to a concept required me to look at inconsistencies and to distinguish between relevant and nonrelevant situations.

Mary added another understanding of the use of critique:

After writing this paper, I was able to critique myself and analyze my own methods of communication.

The last type of assignment discussed here is the paradigm case. Margaret, a master's student, focused on a paradigm case and critical thinking:

My paradigm of nursing administration paper illustrates critical thinking most completely. This exercise required me to examine my knowledge about . . . nursing and nursing administration and develop my own framework for working within the concept. Developing my own perspective and applying it to a model was a difficult task. I had to transfer ideas. . . into a concrete object, support my thoughts with reasons, and clarify ideas and issues.

In summary, analysis of the reflective essays included in the writing portfolios revealed thoughtful perspectives by students about outcomes of critical thinking. Rather than confine the term to the analytic process often discussed in the literature, students emphasized the need to see things related to their nursing practice in new ways, both in looking at detail and in seeing the "big picture." They also emphasized that the critical thinking process involves creative thinking.

Students saw a wide variety of assignments as providing evidence of outcomes related to critical thinking. They described how these assignments helped them identify a variety of components of critical thinking in their written assignments: supporting ideas with evidence and logical reasoning; extrapolating from one occurrence to another; synthesizing of information; stretching of thinking; making connections; seeing the big picture; and analyzing, prioritizing, adjusting, evaluating, and creating. Thus, students' reflections on the writing assignments included in their portfolios suggest that they saw these assignments as useful in helping to document outcomes related to critical thinking.

Analysis of E-Mail Dialogue for Outcomes Related to Critical Thinking
The e-mail dialogue carried out by the six professors over a two-week period consisted of a wide variety of observations related to the portfolios. The approximately 55 pages of printed comments were read by all the researchers, comments were noted, and then two of the researchers used Beyer's (1987) framework to summarize findings related to the portfolio review. In accordance with this framework, data are presented here in three categories: 1) translates data, 2) classifies it and compares it to other data, and 3) infers a generalization about the unique feature(s) of a particular subject or phenomenon.

Translates data. To translate data, one needs to take and synthesize pieces of information in a way that gives them coherent verbal shape and makes unique sense to the learner (Beyer, 1987; Fulwiler, 1982). The e-mail dialogue related to writing portfolios in this study indicated the professors did not see much evidence of students translating data. Most of the writing assignments were seen as largely descriptive in nature, making it difficult to identify critical thinking outcomes in the written work. As one English professor noted, students summarized well, but they needed to go one step further - to evaluate the information. There was a consensus among the professors that rather than evaluating or analyzing sources cited, students merely listed what various authors had said, like "beads on a string."

Although few students selected their clinical logs as papers representative of their critical thinking, the professors agreed that it was these papers that best reflected the students' ability to translate data. Here they showed evidence of their attunement to the complex clinical environment of the technical and human. In these logs, students demonstrated that they could take technical language from nursing and translate it in terms of their personal experience to

express unique insights to an audience outside of nursing. As an English professor observed, the clinical log showed an "incredible blend of care-giver and technician."

Classify data and compare it to other data. Professors were not able to consistently identify critical thinking outcomes reflected in the portfolios in which students classified, compared, and/or contrasted data. This critical thinking skill would appear to involve analysis and critique to guide the student in arriving at conclusions. Although students in this study appeared to view research papers as appropriate assignments to provide evidence of critical thinking, in that research papers required them to seek out important evidence and document these sources in their research paper, professors viewed these papers as primarily descriptive.

Students appeared to see the process of writing research papers as following a strict format that emphasized the reporting of information gained from a review of literature and careful citation of these sources. Thus, the appropriate written product was the important element. Most papers in the portfolios did not address the need to go one step further - to compare and critique sources of information to arrive at new conclusions. One student described how she felt the emphasis on "APA guidelines" and formal style for research papers, such as avoiding writing in the first person, limited her ability to put her own ideas in her paper.

Infer a generalization about the unique features (s) of a particular subject or phenomenon. Nurse educators want nursing students to be able to apply what they have learned to nursing practice - the "so what" of their learning. As noted in the beginning of this article, students' ability to apply critical thinking skills in the complex healthcare environment of today and tomorrow is vital to effective nursing practice.

Most papers in students' portfolios for this study, however, with the exception of those that were excerpts from clinical logs, did not provide evidence of inference, proposing of solutions to problems, or making clear applications to nursing practice. Students' tendency to select research papers for inclusion in the portfolio, as opposed to writings in their clinical journals, may reflect their perceptions that critical thinking is related to "scholarliness," rather than to the simple inferences that can be drawn from their clinical experiences.

In summary, analysis of the e-mail dialogue indicated that professors' perceptions differed from those of students in how critical thinking outcomes were reflected in students' writing. Students tended to see "scholarly" research papers as important evidence of critical thinking. Professors, on the other hand, saw the clinical papers as more reflective of critical thinking outcomes, for it was in these papers that the personal viewpoint of the student shone through as she translated, classified, and compared information from readings with her personal experiences in the clinical area and was able to make unique inferences about her experiences.

Implications for Assessment of Critical Thinking Outcomes in Nursing Students
Implications of this study are presented here within a framework of Writing to Learn. These implications address the value of interdisciplinary assessment of critical thinking outcomes, use of assignments that encourage expressive, as well as transactional writing, and the need to help both students and faculty conceptualize how the writing process relates to critical thinking.

Interdisciplinary Assessment of Portfolios through Email Dialogue

Facione and Facione (1996) noted that expert raters should focus on the quality of analysis, inference, interpretation, explanation, and evaluation exhibited in writing samples. Findings from this study clearly indicate the benefits of interdisciplinary collaboration in the expertise needed to assess writing portfolios for outcomes related to critical thinking. The e-mail format provided an efficient, effective, and enjoyable mechanism for promoting this interdisciplinary dialogue. Busy professors could access the dialogue at convenient times during the twoweek period, read the comments from the other professors, and add their ideas and insights to the dialogue. Although few of the professors knew each other before participating in the study, we quickly came to enjoy the chance to write and "talk" with each other about common values and concerns related to teaching in our own disciplines.

Interdisciplinary assessment of the writing portfolios created new understandings among English and nursing professors as to the type of writing assignments that foster Writing to Learn and provide evidence of critical thinking outcomes. As English professors talked of the students' incredible sensitivity to caregiving reflected in the clinical journals, we, as nurse educators, saw that too often this essence of nursing is covered over in the "scientific" writing that we assign. The need to help nursing students recognize the critical thinking involved in writing about their clinical experiences is an important insight for nursing professors (Brown & Sorrell, 1993). In turn, as the English professors read the students' writings and talked with us, they expressed a new awareness for the complexity of nursing as a profession. One English professor expressed his insights this way during the e-mail dialogue:

Did you know that a pair of doves raised a family in my office this spring? It was very moving and exciting. The thought has just occurred to me that I felt like a nurse when I was giving them all my care and love. And I really was heartbroken when the babies flew away. Do nurses feel empty- nest syndrome when their favorite, and healthy, patients leave them? . . . Do nurses get jaded after a while on the job? Do they lose their sensitivity? How do they sever the emotional connection, which I am sure is necessary? How does this relate to a personal cosmology about the value of what they have professionally chosen to do with their lives? I'm just wondering.

Transactional Versus Expressive Writing in Outcomes Related to Critical Thinking

In reviewing the students' writing portfolios, it was evident that nursing professors tended to emphasize transactional or "scientific" writing assignments. Students, however, noted that more creative approaches to writing are important in the critical thinking process. Research in composition supports this (Baker, 1996; Thaiss, 1991; Young, 1997). If students are to learn to translate data, to gain skills in classifying and comparing data, and to develop skills in inference so that they can put together pieces of information from their readings and experience to create new understandings and meanings, they must be guided to go beyond the limits of transactional writing.

Tanner (1996) noted that the activity of reflecting on practice has received little attention in American nursing literature. Nurse educators need to apply findings from composition research to provide students with more opportunities to experiment with different writing styles, including writing for themselves, rather than for the professor. Students may feel self-conscious about using expressive writing and fear appearing "childish" (Baker, 1996). Students need to see that

faculty value this type of writing as a way to verbalize thoughts not yet welldefined, using language as a way to discover what they want to say. Self-awareness and self-knowledge are essential for thinking critically. While transactional writing provides important skills in scientific and technical writing, "excessive reliance on the transactional function of language may be substantially responsible for our students' inability to think critically and independently. . . Product-oriented, transactional language promotes closure" (Freisinger, 1982, p. 9). In contrast, expressive writing is not as constrained by form and style and provides students with an opportunity to "play" and experiment with ideas and to value the thinking process itself.

Helping Students and Faculty Conceptualize how the Writing Process Relates to Critical Thinking

Findings from this study suggest that students may have different perceptions of how their writing reflects outcomes related to critical thinking than do the nursing faculty assessing their writing for these outcomes. Most students apparently believed that it was the polished "scholarly" and "scientific" papers that faculty would want as evidence of their critical thinking abilities. Yet their reflective essays noted the creativity and vision needed in the critical thinking process. None of the students submitted in-process drafts of their papers that might have shown development of critical thinking.

Nurse educators and students need to discuss what types of assignments are useful in using writing to learn, and to document critical thinking outcomes. Facione and Facione (1996) suggest it may be revealing to assess critical thinking outcomes in what students judge as their "worst" work, as well as their "best" work. In the process of assessing the portfolios in this study, we found that "scientific" papers, which were largely descriptive in nature, were not useful in identifying outcomes related to critical thinking. In general, papers that best showed critical thinking were those in which students compared, contrasted, analyzed, interpreted, and drew logical inferences about ideas and experiences that had personal meaning to them.

Recommendations

Findings from this study suggest that writing portfolios can provide important evidence of critical thinking outcomes in nursing students. To do this effectively, however, several considerations are important:

1. Students should be guided in recognizing that writing is important not only in terms of the written product, but also in stimulating the process of thinking. A variety of writing assignments, including both transactional and expressive writing, and drafts of papers, as well as polished end-products, would be useful in reflecting the critical thinking process.

2. Students should be encouraged to write reflective essays on how their critical thinking skills are related to the writing process in their various assignments and to include these pieces in their writing portfolios. Reflective writing stimulates connections between ideas and enhances both student and faculty understanding of perceptions related to the critical thinking process.

3. Educators should be aware that lack of critical thinking evidenced in portfolios may be a reflection of the professors' teaching. Too much emphasis on "the right answer" or "the right

format" may discourage critical thinking. Teachers need to coach students in how to conceptualize, compare, contrast, and "play" with ideas.

4. Nurse educators should collaborate with faculty in other disciplines to compare and contrast various approaches to the use of writing portfolios in assessment of critical thinking outcomes. E-mail discussions such as used in this study provide a feasible and enjoyable way to accomplish this collaboration.

Conclusions

Most writing assignments probably are not designed to foster skills in specific types of thinking. Although it may be comfortable for students to have faculty give them a template to follow in completing an assignment, this may discourage their solving problems in their own ways. "Canned" assignments may guide students in completing the assignment but may discourage critical thinking. Use of assignments in which students need to identify a thesis from data given or find a solution to a dilemma they may encounter in clinical practice can be a challenging and enjoyable way to strengthen thinking skills related to inference.

This was a small research study but findings suggest that writing portfolios can be effective not only in assessing students" critical thinking skills, but also in helping to promote these skills. Researchers found the e-mail dialogue useful in assessing critical thinking skills as evidenced in the writing portfolios, as well as in enhancing each other's understanding of the assessment task. Although the standardized critical thinking tool was easy to use, faculty in this study had difficulty in applying it to portfolios of unknown students. More research is needed to identify the context in which this tool could be better used.

It is clear that in order to assess critical thinking skills through writing portfolios, faculty must first design assignments that foster critical thinking skills. In addition, they must guide students in understanding how writing can both enhance critical thinking and provide evidence of critical thinking skills. Fulwiler (1982) identified the need to teach students to trust the thinking process that occurs during their writing, rather than merely focusing on the final product. Jasper (1995) noted that portfolios have the potential to bring to light the critical thinking that comes from experiential learning - a type of knowledge that too often remains embedded in nursing, yet represents nursing's expertise.

Sara, one of the student participants, summarized insights gained through this study:
The advanced practice article relates to the application of critical thinking skills because it encompassed not only what I had been doing in the past, but what I wanted to take from my experience at [her university] and utilize in my future . . This paper allowed me to express my ideas within the shelter of academia before being possibly ridiculed in the reality of the clinical practice situation. I believe, however, that the bridging of information and learning from academia to practice should allow the genuine expression of these ideas . . . This was my last attempt to "test the waters" in a safe environment.

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