Integrative Thinking and Learning in Undergraduate Nursing Education: Three Strategies

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Abstract

This article describes three learning activities used in the undergraduate nursing degree program at a mid-sized university in northeastern Ontario, Canada. Each activity, a reflective writing assignment, scenario testing, and an OSCE experience, is considered in terms of integrative thinking. Formal and informal evaluation of the activities is also discussed.

Based on the authors' experiences, integrative thinking including habits of mind and cognitive skills can be directed and enhanced. To maximize students' growth as integrative thinkers, they should be exposed to many kinds of activities that target this growth. Generally, such activities tend to be case-based and interactive in nature. They also require a level of scaffolding or directedness. To develop and implement such activities, teachers are encouraged to work with educational researchers and instructional designers.

KEYWORDS: integrative thinking, reflective writing, scenario testing, OSCE experience
There is little question that critical thinking has been recognized as central to competent nursing care. Given this, it follows that undergraduate nurse-learners should be provided many and varied opportunities to learn and apply critical thinking in safe settings. As nursing educators have pointed out over time, it is shortsighted to think that nurses will be able to teach themselves to be self-conscious, organized, and reflective thinkers within the fast-paced context of contemporary health care without instruction and practice in the safety of the learning environment (Gaberson & Oermann, 2007; Ironside, 2003; Johns, 1995, 2004).

Quite recently, the literature on critical thinking in nursing education has evolved to include a concept called integrative learning (Tanner, 2007). Scheffer and Rubenfeld (2000) suggest that nurses who are skilled critical thinkers exhibit specific habits of mind and cognitive skills. These habits of mind include confidence, contextual perspective, creativity, flexibility, inquisitiveness, intellectual integrity, intuition, openmindedness, perseverance, and reflection. The cognitive skills noted by Scheffer and Rubenfeld are analyzing, applying standards, discriminating, information seeking, logical sequencing, predicting, and transforming knowledge. Additionally, Tanner suggests that integrative learning, at its best, is characterized by:

- Intellectual training to learn the academic knowledge base and capacity to think in ways important to the profession.
- A skill-based apprenticeship of practice, including clinical judgement.
- An apprenticeship to the ethical standards, ethical comportment, social roles, and responsibilities of the profession, through which the novice is introduced to the meaning of an integrated practice of all dimensions of the profession, grounded in the profession’s fundamental purposes. (p. 532)

Integrative learning is a concept gaining attention across curricula in North American university campuses. It is learning that is intentionally designed with varying levels of directedness.

Based on the above discussion and the idea that nursing schools everywhere are facing what Ironside (2004) calls the “additive curriculum” (p. 509) due to a knowledge-based society, this university’s program of undergraduate nursing education is committed to the development of students as integrative thinkers and learners. Three learning strategies used in the program that foster students’ competence as integrative thinkers are described: program-wide use of writing-based learning activities; scenario testing supported by
teacher inquiry; and the Objective Structured Clinical Evaluation (OSCE) experience, an activity where students demonstrate integrative thinking in concrete ways. These strategies involve different levels of directedness and kinds of scaffolding depending on the program year.

Based on feedback from faculty and students, these approaches are contributing to students’ development as thinkers and clinicians who must perform competently and confidently in the field. In the strategies described herein, the feedback ranges from anecdotal and less formal to more complex. Plans are underway for continued use of these strategies and further evaluation of their effectiveness.

LITERATURE REVIEW

The connection between critical thinking and the need for nurses to be competent critical thinkers is recognized. At the same time, as an historical look at the literature reveals, the perspectives on critical thinking and nursing are diverse (Brookfield, 1987, 1995; Brunt, 2005a; Case, 1994; Paul, 1993; Paul & Elder, 2002; Riddell, 2007; Scheffer & Rubenfeld, 2000; Schumacher & Severson, 1996; Simpson & Courtney, 2002). Two approaches well documented in the literature as facilitators of thinking and in keeping with principles of adult learning are interactive learning and reflection through writing (Brookfield, 1987, 1995; Cranton, 2006). Use of case studies in interactive learning and reflective writing is reported to enhance the transition from theory to practice. They also provide opportunities to explore complex clinical situations in safe contexts before the student experiences them with real patients (Brunt; Simpson & Courtney; Staib, 2003).

Integrative Thinking Through Interactive Activities

As far back as Dewey (1916), interaction has been regarded as a key element in the decisions that educators make about incorporating new technologies and strategies into an educational experience. For example, if a technology or strategy enhances interaction, it is likely to be considered. If not, the likelihood of its adoption is radically reduced. Some educators argue that such interaction not only supports but actually defines the educational experience (Anderson, 2003). While interaction is often considered in relation to other people, it can, in the learning setting, also refer to interaction with content and the learning environment itself (Bastable, 2008; Billings, 1999; Bonk & King, 2008; Cragg, 1994a, 1994b; Cragg, Dunning, & Ellis, 2008). According to Ironside (2004), “ongoing and interactive understanding of both the context of care and
patients’ experiences of wellness and illness” (p. 510) is an essential component of nursing education. It is suggested that scenario testing and OSCE testing are interactive activities that support clinically-focused learning as well as assessment.

In scenario testing, questioning by the teacher is a means of guiding the student’s thinking process and increasing the level of thinking (Brunt, 2005a; Gaberson & Oermann, 2007; Ironside, 2003; Riddell, 2007; Twibell, Ryan, & Hermiz, 2005). Gaberson and Oermann suggest different types of questions that a teacher can ask to encourage thinking: questions that clarify, probe assumptions and reasons, seek differing perspectives, and explore consequences. The overarching intention is to foster thinking beyond the ‘simple answer’ and to move to the more complex level. Thus, during scenario testing, the teacher asks questions to help the student figure things out; to see the whole picture; and to consider the complexity of the situation.

The OSCE experience was first used in medical education (Carraccio & Englander, 2000). The traditional OSCE experience consists of rotating students through a system of stations simulating different clinical realities (McKinley et al., 2008; Redfern, Norman, Calman, Watson, & Murrells, 2002; Rushforth, 2007). Each station is constructed to assess a particular skill against a pre-established checklist. Objective Structured Clinical Evaluations facilitate assessment of a complex repertoire of skills, knowledge, and attitudes required for competent practice (Carraccio & Englander; Rententschier, Eaton, Cappiello, McNally & McWilliam, 2007). While there is limited nursing literature describing the use of OSCEs, some nursing researchers have reported that OSCE use is a positive and useful learning and evaluation process. However, it does need to be modified to reflect the nature of nursing practice which considers clients from a holistic perspective as opposed to specific task-oriented competencies and skills (Nicol & Freeth, 1998; O’Neill & McCall, 1996; Rushforth). To support this holistic perspective, it is necessary to vary the design of the OSCE experience in nursing education. Possible variations include one comprehensive station or multiple rotating stations with varying time limits ranging from 4 minutes to 70 minutes.

**Integrative Thinking Through Reflective Writing**

In the nursing education literature, described repeatedly is the use of reflective writing as a way of developing personal and professional confidence and awareness as a clinician. This should not be surprising given the prominence that reflective practice has held in the field over time (Daroszewski, Kinser &
Lloyd, 2004; Kennison & Misselwitz, 2002; Kessler & Lund, 2004). According to Sediak (1997), reflective writing prompts “students to think critically about their experiences and facilitate[s] self-directed learning as students develop skills as professionals” (p. 16). Similarly, Ironside (2003) argues that teachers and students should be engaged in “converging conversations wherein many perspectives can be considered” (p. 510). Such convergence includes questioning, perspectival openness, uncertainty, and fallibility.

Written reflection by nurse-learners can take several forms. It typically involves a relationship with an expert nurse-teacher and/or peers. In both cases, writing is an opportunity “to reflect on practice, explore reactions, discover relationships, and connect meanings to past experiences” (Kennison & Misselwitz, 2002, p. 239). It can also be a way to reflect using recognized frameworks such as Johns’ (1995, 2004) model of ways of knowing. This model is integral to this university’s program. When Johns’ terms knowing and ways of knowing are broken down as questions, they become a kind of scaffolding for identifying four kinds of thinking: aesthetic, personal, ethical, and empirical. Aesthetic thinking involves challenges to the self: the nurse reflects on what he/she is trying to achieve and the course of action taken. Personal thinking focuses on the nurse’s feelings. Ethical thinking deals with the issue of congruence between the nurse’s actions and value system. It is about responding to questions such as: “how did my actions match with my beliefs?” and “what factors made me act in ways that do not fit with my values?” In empirical thinking, the nurse reflects on how nursing knowledge informs practice.

**Strategy one: Reflective writing and integrative thinking.** This first strategy involves the use of Johns’ (1995, 2004) model which is foundational to all 4 years of the program. At different points in the program, students are required to reflect verbally and in writing on the relationship between Johns’ model and their developing practice.

One written assignment used in a second year level course that exemplifies the requirement that students be integrative thinkers skilled in using Johns’ (1995, 2004) model is described. In the assignment, the student assumes the role of a community nurse and responds in narrative form to the following four questions based on a case study with a family focus, for example, what:

- actual data or information do I have about this case?
- other data do I need to better understand this situation?
- are my provisional hypotheses (problem or need statements)?
- learning issues have I identified in this case?

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Students are instructed to be aware of their thinking processes as they answer the questions.

To validate that this assignment does facilitate demonstration of various kinds of thinking by nurse-learners, a coding exercise was carried out with a group of 34 post-RN (post-certificate) students. Two-thirds of the nurse-learners were between the age range of 36 and older; one-third were between 20 and 35 years of age; additionally, two-thirds were nurses working in fulltime settings.

The assignment was used in a combined theory and practice course, Nursing Healthy Individuals and Families. The focus is on nursing process, group dynamics, teaching and learning, critical thinking and reflective practice, family assessment, growth and development, and therapeutic communication. Students support their learning by practice-based work in the community. Some of the students were individuals at the beginning of their degree program while others were near completion of the program.

An unbiased researcher, in contrast with the course instructor, coded 500-word passages taken from the students’ assignments for evidence of the four ways of thinking. The kind of thinking demonstrated most frequently was empirical. Each student started the assignment with a description of what was empirically known about the family and the family’s life situation (26 examples of empirical thinking in 500 words). There was some demonstration of aesthetic thinking in statements dealing with the nurse’s role as a care provider for the family (12 examples per 500 words). At times, this self-assessment was visible in the words used, while on other occasions, it was found in the tone of the text. Personal thinking was minimally evident but did occur intermittently when the student described how he/she felt about the situation (5 examples). Ethical thinking did not tend to be demonstrated (1 example). The following passage illustrates how one student’s work was analyzed for evidence of the four kinds of thinking.

This student chose to complete a case study about a woman with two small children at home: a child of 28 months and a new baby of 3 months. At home on maternity leave, this new mother is having trouble managing the routines of a young family; she also feels that her husband is becoming impatient with the situation.

The evidence of Johns’ (1995) different ways of thinking in the student’s analysis of the case was ranked as follows: 26 examples of empirical thinking, 12 examples of aesthetic thinking, 5 examples of personal thinking, and 1 example of ethical thinking.
As illustrations of empirical thinking, the student offered two main kinds of statements: the first pertained to what she knew about the family based on the case, "With regard to marital status, we are told that Carol is married to Ron who works full-time hours from 6-8pm nightly." A second form of empirical thinking occurred when the writer connected her ideas to relevant nursing-based literature:

Most depressed post-partum women have self-esteem which is reinforced by the infant’s temperament. An infant such as Sophie who is irritable and demands more from a fatigued mother who has limited support from a significant other can experience an increase in depressive symptoms. (Allender & Spradely, 2001)

The assignment also showed, at different points, the writer to be engaged in what Johns (1995) refers to as aesthetic and personal thinking. Instances of the former occurred near the beginning and middle of the assignment when the writer was discerning what she needed to know about this family in order to assist it, “It is not mentioned that Ron is the father of both children but I will assume he is.” Although the writer’s assumption may be incorrect, the passage does demonstrate awareness of a need to gather further information. Additionally, the writer is self-aware of the act of making assumptions.

Evidence of personal thinking tended to occur near the end of the assignment when the writer described her thinking process, “By analyzing this scenario, I chose to seek more information and apply some logical reasoning by utilizing literature of child/family development.”

In summary, the coding exercise for thinking demonstrates that this written assignment elicits integrative thinking that ties to students’ intellectual training. The assignment enables clinical judgment practice and awareness of social roles and professional responsibilities.

Strategy two: Scenario testing and integrative thinking. The scenario testing experience is an opportunity for students to demonstrate their ways of thinking and ability to make connections in a clinically-based case study. The particular group of 46 learners described herein were in the third year of the undergraduate nursing program. The group was composed of full-time students including 44 women and 2 men. Of the men, one was a mature student; there were no post-certificate students. While participating in this experience, students are expected to integrate relevant content and experiential knowledge including anatomy and physiology; pathophysiology; determinants of health; developmental stages; risk factors; therapeutic interventions; and ethical considerations.
Questions are posed to the student within a case study context. Students are expected to think 'on their feet' and to think 'aloud'. As beneficial to the student, the teacher may choose to role-model higher-level thinking with the student. For example, the teacher might say, “In this case study I see X, Y, Z. Because of this, I am considering 1, 2, and possibly 3 as interventions.” As previously suggested, and emphasized in the literature, is the importance of a student-centered learning environment (Brunt, 2005a; Ironside, 2004; Schaefer & Zygmont, 2003). This environment enables the student to practice critical thinking in a safe context with varying degrees of interaction and/or dialogue with the teacher. Supportive interaction between the teacher and student ensures that the student makes relevant interconnections and clinical judgments.

Instead of attending a class, each student is scheduled into the laboratory for his/her scenario test. Upon arrival at the laboratory, the student randomly picks a case study and proceeds to the designated station. At the station, he/she reads the case study; seeks clarification if required, and then responds orally to the questions posed within the case study. The teacher is present to ‘meet the student where he/she is at’ and offer support in responding to the case study. Students require varying degrees of teacher support and questioning in order to increase their level of thinking.

The consensus statement by Scheffer and Rubenfeld (2000) was selected as the basis of a rubric to evaluate student thinking abilities (Table 1). Students work towards using the ten habits of mind and the seven cognitive skills identified by Scheffer and Rubenfeld. Significantly, this consensus statement “moves away from a blanket definition of critical thinking to the identification of critical thinking competencies that can be applied” (Brunt, 2005b, p. 61).

Descriptive verbal feedback is sought from both the student and teacher perspective. Students describe their thought processes and the analysis strategies they use to draw specific conclusions. In the example of scenario testing described, there seemed to be a realization of how much they actually knew, and this tended to increase their clinical confidence. Student comments included: “not as bad as I thought it would be” and “we should do more of this.” From a teacher perspective, establishing climate, using case studies, and questioning students to support critical thinking development were noted as comfortable and effective. While the amount of support and level of thinking varied among students, the teacher felt that the students were pushed to a higher level of thinking.

This strategy supports integrative thinking by presenting students with an opportunity to demonstrate their intellectual training, clinical judgment, and
professional responsibilities with a client. This inquiry-based activity prompts students to think at higher levels and in different ways.

**Table 1**

*Scenario Testing Evaluation Rubric Criteria*

<table>
<thead>
<tr>
<th>Well Done</th>
<th>Satisfactory</th>
<th>Insufficient</th>
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<tbody>
<tr>
<td>• comprehensive response to scenario questions reflecting critical analysis</td>
<td>• general response to scenario questions but missing some relevant information related to critical analysis</td>
<td>• unclear response to scenario questions, lack of logical sequence or missing relevant information related to critical analysis</td>
</tr>
<tr>
<td>• synthesis of nursing, clinical judgment and clinical decision-making as supported by the evidence / theory.</td>
<td>• integration of nursing, clinical judgment and clinical decision-making with some limited reference to the evidence / theory.</td>
<td>• lack of integration of nursing, clinical judgment and clinical decision-making with no reference to the evidence / theory.</td>
</tr>
<tr>
<td>• comprehensive demonstration of critical thinking descriptors</td>
<td>• general demonstration of critical thinking descriptors</td>
<td>• limited demonstration of critical thinking descriptors</td>
</tr>
<tr>
<td>• 12 – 14 descriptors</td>
<td>• 9 – 11 descriptors</td>
<td>• less than 9 descriptors</td>
</tr>
</tbody>
</table>

(range: 4.25 – 5.0)\(^a\)  (range: 3.25 – 4.0)\(^a\)  (range: 0 – 3.0)\(^a\)

**Note.** \(^a\) Each row is scored out of 5 marks, with the overall rubric score out of 15 marks total. Descriptors / Habits of Mind: confidence, contextual perspective, creativity, flexibility, inquisitiveness, intellectual integrity, intuition, open-mindedness, perseverance, reflection. Descriptors / Cognitive Skills: analyzing, applying standards, discriminating, information seeking, logical reasoning, predicting, transforming knowledge.
Strategy three: OSCE process and integrative thinking. The OSCE process described herein occurs in the first semester of a first year nursing practice course in which the majority of students are adult learners under age 30. As a learning experience, the OSCE is an opportunity for students to demonstrate skills representative of the holistic care that is fundamental to nursing education.

The process of the OSCE requires each student to complete a randomly selected activity involving a standardized client. Evaluated by one assessor in a controlled laboratory setting, the student has 20 minutes to complete the OSCE. A tool that measures the competencies of safety, asepsis, knowledge, organization, and caring is used to evaluate performance. The five elements of each competency are scored on a Likert scale from 0 (not present) to 4 (excellent).

In order to collect data for the first three years of this particular OSCE experience, a multi-site approach involving four locations in four small to mid-sized communities in northern Ontario was used. This enabled a more representative sample than otherwise possible, thus enhancing the generalizability of the findings. The convenience sample included a total of 565 first year students who volunteered to participate.

Correlations between the OSCE results and six other evaluation methods conducted in this nursing practice course were examined. The methods included a multiple choice midterm test, a journal review assignment, an Adopt-a-School assignment, a final exam involving multiple choice and short answer questions, a family assessment assignment, and a laboratory test. A factor analysis of the OSCE tool was completed.

The correlation between the OSCE scores and the evaluation methods was low. This finding suggests that clinical competencies, in addition to theoretical knowledge, were measured by the OSCE. They were not, however, captured by the other evaluation strategies.

For the purpose of comparison, the factor analysis of the OSCE tool involved two methods of extraction: the principal components analysis (PCA), and the principal axis factoring (PAF). Both extraction methods identified three underlying factors that accounted for the majority of variance in scores. However, after three rotational methods were conducted, two factors were identified (Table 2). These factors were safety and anticipation. Safety includes the concept of client and provider care, as well as the broader consideration of environmental safety. Anticipation is the process of pre-thinking or preplanning which is an initial building block of critical thinking.
Table 2

Principal Axis Factoring: Rotations

<table>
<thead>
<tr>
<th>Rotation</th>
<th>Factor</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oblim</td>
<td>1</td>
<td>1.000</td>
<td>-.259</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>-.259</td>
<td>1.000</td>
</tr>
<tr>
<td>Promax</td>
<td>1</td>
<td>1.000</td>
<td>-.282</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>-.282</td>
<td>1.000</td>
</tr>
<tr>
<td>Varimax</td>
<td>1</td>
<td>.971</td>
<td>-.240</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>-.240</td>
<td>.971</td>
</tr>
</tbody>
</table>

According to a number of nurse-researchers, ensuring client and personal safety is the fundamental tenet of clinical competence (Defloor et al., 2006; Dick, 2004; Girot, 2000; Manley & Garbett, 2000). These authors also suggest that critical thinking and problem-solving ability such as anticipating variables which impact the outcome of care provided by students are fundamentals of client safety. This anticipation requires students to use critical thinking that incorporates values, beliefs, and attitudes (Cullen, 2005). According to Kataoka-Yahiro and Saylor (1994), anticipation characterizes the complex and higher order concept of integrative thinking.

The OSCE process supports integrative thinking in that the student pulls together prior learning that can be practiced in a safe laboratory environment. The student benefits from concrete verbal and written feedback as well as the requirement to demonstrate ethical standards and comportment when interacting with a standardized client. Finally, the student is expected to utilize clinical judgment when a critical event develops during the OSCE activity, thus leading the student to think “on his/her feet” (Rentschler et al., 2007).

DISCUSSION

The previous descriptions have shown that integrative thinking can be supported through different learning activities and with varying student populations. The participants included undergraduates from different years in the
program and post-RN (post-certificate) learners. Importantly, the activities are also level-specific: they target the knowledge and skills of three discrete groups.

While the three activities are level-specific, they do share some important similarities. For example, each uses a teacher-prepared case study that a student responds to and works with. Additionally, each activity provides the student with a level of directedness in terms of how to proceed and to think. In the written assignment, students have questions to scaffold their thinking. In the scenario testing, questioning occurs in both written and verbal formats to advance student thinking to a more complex level. In the OSCE process, the student is given a prescribed task to perform.

Each activity also involves interaction. In the written assignment, the student has a window of time in which to prepare the assignment and to interact with the presented content, other content sources, other students, and the teacher, as required. The student also engages in self-dialogue through mental processing and the putting of words on the page. Interaction with the teacher occurs after the assignment is graded and includes written commentary. By comparison, during the scenario and OSCE experiences, interaction is with a particular physical setting and with the self. This time, however, the student uses either silent mental processing and/or talking to self as means of completing the work. In the scenario testing, there is further interaction with the teacher as required during the session, while in the OSCE experience, there is also teacher interaction, although typically, it occurs immediately after the session.

Certain differences likewise merit discussion. For example, the writing activity emphasizes integrative thinking with a health promotion focus; the other activities address health protection and illness prevention. Additionally, the reflective writing is entirely cognitive in nature while the other two are cognitive and kinesthetic in nature.

The evaluation conducted suggests two findings. The first is that the three strategies facilitate demonstration of different kinds of thinking. This does not mean, however, that different kinds of thinking will be present to the same degree in the same activity. Based on this, if the primary goal is to cultivate a particular kind of thinking, such as a specific habit of mind and/or cognitive skill, careful instructional design is required.

Secondly, while it is natural for students to experience some anxiety about new activities such as scenario testing and the OSCE process, if the activity and the student have been carefully prepared, the student is likely to respond
favourably. As the anecdotal comments shared about the scenario testing reveal, it is validating for a student to discover that he/she knows more than anticipated and can demonstrate this knowledge.

CONCLUSION

As evidenced through the discussion, there will be variation in how and to what extent the three strategies support students’ achievement of integrative learning as discussed by Tanner (2007). Based on this idea, students need to be exposed to a wide variety of learning activities in order to grow in their ability to deliver holistic and competent nursing care. Additional research into which kinds of activities tend to elicit specific kinds of thinking is recommended.

If integrative thinking and learning are important goals of nursing education programs at the undergraduate level, students should be exposed to many and varied learning opportunities. Ideally, these learning occasions will include components from case-based learning; provide students with chances to interact with self, others, and the learning setting; and include enough scaffolding to ensure that students feel safe in their learning but challenged enough to grow as integrative thinkers. Variety in the design and administration of learning activities is encouraged. Such approaches allow students to experience dissimilar thinking in varying degrees. Finally, teachers are encouraged to work closely with educational researchers and instructional designers to ensure intention and directedness of activities target different habits of mind and cognitive skills.

REFERENCES


