Developing critical thinking skills from clinical assignments: a pilot study on nursing students' self-reported perceptions

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Aim Clinical assignments in nursing education provide opportunities for students to develop thinking skills vital to the effective delivery of patient care. The purpose of the present study was to examine students' perceived levels of confidence for using thinking skills when completing two types of clinical assignments.

Background Clinical educators and managers are challenged to develop teaching and learning strategies that help students think critically and reflectively and transfer these skills into sound nursing practice.

Method This study is based on the theoretical framework of critical thinking within the nursing process framework. Undergraduate nursing students ($n = 51$) completed surveys indicating their confidence in using seven thinking skills for nursing care.

Results Students indicated significantly more confidence when implementing the journal format as compared with the care plan format when analysing information, determining relevance, making connections, selecting appropriate information, applying relevant knowledge and evaluating outcomes.

Conclusions The findings of the present study propose a new approach for enhancing students' thinking skills. Journaling is an effective strategy for enhancing students' thinking skills.

Implications for Nursing Management Nursing managers are in key organisational positions for supporting and promoting the use of the journal format and building supportive and collaborative learning environments for students to develop thinking skills for managing patient care.

Keywords: clinical journaling, nursing education, teaching methods, thinking skills

Introduction

The education of nurses is a shared responsibility between schools of nursing and service providers. Shortages of nurses and nursing faculty coupled with advances in science and technology have reshaped nursing education and nursing practice. Challenges confronting the profession are not unique to the USA and lurk on the forefront for many other developed and developing nations (International Council of Nurses &

Florence Nightingale International Foundation 2006). We, therefore, designed this pilot study to explore an educational strategy and assess nursing students' self-reported perceptions of developing thinking skills for clinical reasoning in the management of patient care when completing a clinical assignment.

Literature review

Professional nursing education prepares students to use thinking and problem-solving skills to analyse situations and make decisions pertinent to patient care. Simpson and Courtney (2002) report that, on a daily basis, 'nurses sift through an abundance of data and information to assimilate and adapt knowledge for problem clarification and solution' (p. 89). Moreover, Huston (2008) highlights the importance of expert decision-making as one of eight nursing leadership competencies for 2020. Given that skilled nursing practice requires thinking skills for clinical reasoning and decision making, it logically follows that the development of thinking skills is essential in nursing education. The National League for Nursing (NLN) 2005 position statement, *Transforming Nursing Education*, specifies the importance of involving students as active participants in the educational enterprise and departing from content-driven curricula because the complexity of practice environments demands new competencies of nurses. In addition, this document heralds a 'Call to Action' to nurse educators, urging pedagogical research as a basis for teaching and learning strategies and evaluation methods in nursing education. More recently, a *NLN Think Tank on Transforming Clinical Nursing Education* (2008) met for the purpose of beginning an extended dialogue on the topic of clinical education and the most effective ways to help students learn the practice of nursing. They emphasised an increased focus on critical thinking, clinical judgment and the development of 'thoughtful nurses who can practice independently and interdependently … and who think like a nurse' (NLN 2008, p. 3). The American Association of Colleges of Nursing, in its *Essentials of Baccalaureate Education for Professional Nursing Practice* (2008), stresses the importance of clinical reasoning and critical thinking for all baccalaureate graduates because these skills are required for practice in the ever-changing and complex health care environment. Moreover, Benner *et al.* (2010) are calling for radical transformation through four essential shifts in nursing education including an emphasis on clinical reasoning and multiple ways of thinking that include critical thinking. They indicate that 'nurses need to be prepared to practice safely, accurately, and compassionately, in varied settings, where knowledge and innovation increase at an astonishing rate' (Benner *et al.* 2010, p. 1).

Literature from nursing education describes an array of practices for developing learners' thinking abilities. Kuiper and Pesut (2004) have reported on the necessity of both cognitive and metacognitive skill acquisition, using the self-regulated learning model to prompt reflection. Similarly, Horton-Deutsch and Sherwood (2008) have described reflection as an educational strategy for preparing emotionally capable nurse leaders. Weber (2005) has proposed employing the Socratic method of questioning with nurse practitioner students but also relates the importance of dividing questions into a hierarchy (i.e. novice, intermediate and advanced) based on the student's accumulated clinical experiences. Concept mapping (CM), a metacognitive tool that visually represents a student's thinking, has been widely reported as a method to promote critical thinking (King & Shell 2002, Vacek 2009), and research exists which supports the use of CM to foster critical thinking (Abel & Freeze 2006, Hicks-Moore & Pastirik 2006, Wilgis & McConnell 2008). Comer (2005) has described a creative method to enhance clinical reasoning skills by assisting students to organise and synthesise their patients' clinical data using a clinical detective tool on a single-page worksheet. Students have reported increased abilities in critical thinking and self-directed learning through clinical journaling (Ibarreta & McLeod 2004). More recently, the use of clinical simulation in nursing education has provided a means for students to learn and apply theoretical concepts of nursing care within a safe environment (Larew *et al.* 2006, Bambini *et al.* 2009). Sullivan-Mann *et al.* (2009) have reported that simulation experiences are related to higher critical-thinking scores. Rubenfeld and Scheffer (2006) have offered tactical suggestions for activities, such as mind maps, case studies and reflection projects that promote critical thinking for nursing education and professional practice. In addition, they have provided clear examples of behaviours and interactions that promote and squelch critical thinking. To sum up, several studies have focused on describing critical thinking and different strategies to promote thinking skills. However, it is possible to claim that the transferability of the learned skills and applicability in practice have remained unclear.

The necessity of preparing students for today's complex health care environment after graduation has resulted in new academic and practice partnerships where nurse managers have key roles. Allan *et al.* (2008) have

raised the question, 'what should student nurses learn and from whom?' Collaborative conversations and initiatives have emerged among nurse managers, preceptors/mentors, staff nurses and academic faculty. Hutchings *et al.* (2005) have researched approaches for supporting learners in clinical practice and concluded that educational staff are needed at operational levels with timely, appropriate audit information to support allocation decisions and identify strategies to enhance the quality of learning in practice. One of the most recent innovations are patient care units known as dedicated educational units (DEU). These units are transforming the care environment to promote the development of staff nurses as clinical instructors while working collaboratively with clinical faculty coordinators to derive the best practices to teach and evaluate critical thinking in students (Moscato *et al.* 2007, Mulready-Shick *et al.* 2009). Ranse and Grealish (2007) have explored the perceptions of nursing students regarding their learning in the clinical setting of the DEU. Their research findings showed that acceptance on the unit was highly valued by students and staff interest in student learning contributed to their learning experiences. In addition, this study provided evidence for the importance of the clinical experience in assisting students to connect propositional knowledge discussed in the classroom with their learning in practice. However, Ranse and Grealish (2007) indicated that 'further development of educational strategies and the infrastructure to support reflection and critical analysis of practice is required to assist students to learn' (p. 178).

Purpose of the study and theoretical framework

The purpose of the present study was (1) to describe students' perceived levels of confidence for using thinking skills when creating a written care plan and a journal, and (2) to determine whether students noted a difference between the two formats in relation to promoting and using thinking abilities. In addition, grade point average, employment, hours worked and time to complete a specific type of assignment were explored in order to determine if these variables contributed to differences between the two assignment formats.

The present pilot study is based on the theoretical framework of critical thinking identified by a consensus group of critical-thinking experts (Facione 1990) and conceptualised within the nursing process framework by Wilkinson (1991). Facione (1990) and a panel of experts articulated a consensus definition of critical thinking, which they conceptualised in terms of two dimensions: cognitive skills and affective dispositions. This study applied cognitive dimensions and sub-skills reported by Facione (1990), which include analysis, interpretation, inference, explanation, evaluation and self-regulation.

The nursing process as described by Wilkinson (1991) is a framework that provides the process for independent critical thinking and actions taken by nurses. It is also a systematic approach that nurses follow when delivering patient care to identify, prevent and treat actual or potential health problems and promote wellness (Wilkinson 1991). According to Wilkinson, components of the nursing process include assessment, diagnosis, planning, implementation and evaluation. The nursing process itself is cognitive and involves the use of critical and creative thinking skills for analysis, problem-solving and decision-making activities (Wilkinson 1991). Within Wilkinson's framework, critical thinking and the nursing process are closely aligned but not identical: 'Critical thinking is an essential part of problem solving and decision making. Therefore, it is essential to the nursing process' (Wilkinson 1996, p. 34). Chabeli (2007) depicts the interconnectedness of frameworks proposed by Facione (1990) and Wilkinson (1991, 1996) in her literature review on methods to facilitate critical thinking in clinical nursing education. As she indicates, nurses are challenged on a daily basis to make rational and critical clinical decisions and form logical judgments in order to manage and solve health-related problems. Although Table 1 appears in a linear dimension to help demonstrate the relationship of concepts, the core cognitive skills identified by Facione (1990) are dynamic and interactive, as is the interdependent nature of the five phases of the nursing process.

Although research exists using tests that measure the influence of nursing curricula on students' thinking abilities (Colucciello 1997, Adams 1999, Spelic *et al.* 2001, Profetto-McGrath 2003, Shin *et al.* 2006), findings have been inconclusive or inconsistent, because skills of classic logic as opposed to thinking skills that target specific clinical experiences of nurses had been measured (Brunt 2005, Walsh & Seldomridge 2006, Mundy & Denham 2008). Moreover, little information is available regarding how students perceive their abilities to think and process information related to their delivery of patient care. Using a metacognitive approach of asking students to reflect about their thinking, this pilot study explored students' levels of confidence for using thinking skills when developing a patient care assignment.

Table 1

A conceptualization and operationalization of thinking skills for nursing practice within the framework of core cognitive critical thinking skills and sub-skills (Facione 1990) and the nursing process (Wilkinson 1991)

Core cognitive critical thinking Skills and Sub-Skills (Facione 1990)	Nursing process (Wilkinson 1991)	Thinking skills for nursing practice (Marchigiano et al. 2010)
Analysis	Assessment	Analysing information
Examining ideas, identifying arguments, analysing arguments		
Interpretation		Determining relevance
Categorization, decoding significance, clarifying meaning		
Inference: Form Conjectures and Hypotheses	Diagnosing	Making connections
Querying evidence, conjecturing alternatives, drawing conclusions	Planning	Setting priorities
Explanation	Implementation	Selecting appropriate information
Stating results, justifying procedures, presenting arguments		Applying relevant knowledge
Evaluation	Evaluation	Evaluating outcomes
Assessing claims, assessing arguments		
Self-regulation		
Self-examination, self-correction		

Adapted from *Facilitating Critical Thinking Within The Nursing Process Framework: A Literature Review* by M. Chabeli 2007, *Health SA Gesondheid*, 12, p. 76. Copyright 2007 by Health SA Gesondheid.

Methods

Study design

A descriptive, cross-sectional design was used to report students' perceived levels of confidence in using thinking skills when creating a clinical care plan and a journal. The dependent variables were confidence ratings for seven thinking skills. The independent variables included the assignment formats of clinical care plan and journal. Grade point average (a measure of a student's cumulative grades while in college which is calculated on a 4.00 point scale, where 4.00–3.70 = A/excellent or exceptional, 3.69–2.70 = B/above average, 2.69–1.70 = C/average or satisfactory, 1.69–0.1 = D/below average and 0 = F/failure), employment, hours worked and the time required to complete an assignment were extraneous variables. As a result of the small number of males in the sample, gender differences were not explored.

Sample and procedure

The present study was conducted at a liberal arts college with an approximate total enrolment of 1100 students in the northeastern USA. The data were collected in December 2008. Nursing students in an undergraduate programme were introduced to this pilot research project in an adult nursing course at the start of their third year of a 4-year programme leading to a bachelor of science degree in nursing (BSN). During the course, students were required to complete four compulsory assignments with two in a care plan format and two in a journal format. The care plan assignment integrated the five components of the nursing process: assessment, diagnosis, goal-setting, intervention and evaluation. Within this framework, students recorded a full history and physical examination; documented laboratory findings; included medication information concerning the action, dosage, side effects and nursing considerations for all of the patient's medications; and developed one to two paragraphs describing the pathophysiology of the patient's primary medical diagnosis. Based on this information, students created a prioritised, comprehensive list of a patient's nursing diagnoses, long- and short-term goals, nursing actions and a brief statement concerning goal accomplishment.

The journal format required responses to 10 situated patient care-related questions with latitude for including additional information on specific occurrences during the patient care experience. For example, students could record information concerning a nurse–physician interaction or an ethical dilemma that emerged. Situated questions for the journal included responses to questions such as, 'Discuss how pertinent past medical history may have an effect on the patient's recovery from this hospitalisation'; 'Explain your first and most important priority of care and why it took precedence'; 'Explain why you gave the medications that you gave, whether the dosages were appropriate for your patient, and what nursing measures were required based on the medication'; and 'Describe how you would evaluate your care and explain what you would do differently'. Each journal entry provided information about the context of a nurse–patient interaction, along with observations and feelings as a basis for analysis, reflection, planning, intervention and evaluation. For

this pilot study, students could choose which assignment format to implement for their patient encounters; however, it was compulsory within the course for students to complete two care plans and two journals.

Although completion of the four assignments was a course requirement, students were asked to participate in the study at the end of their clinical rotations by written consent, with an assurance that all responses would be confidential and the results processed anonymously. Students were informed that participation in this project would have no impact on the final course grade or evaluation. In addition, they were told that they would be informed of the results of the study and that the findings would not directly affect them but could impact future students who enrolled in the course. The study was approved by the college's Institutional

Review Board, and students who volunteered to participate completed a brief background questionnaire designed to obtain a biographical profile of the group. Fifty-three students completed the course and 51 students participated ($n = 51$). Fifty of the 51 (98%) students were female. All were English speaking, with a range in ages between 20 and 22 years.

Instrument

To establish content validity, the 16 constructs for thinking were identified from the consensus list of critical-thinking cognitive skills and sub-skills from the earlier research reported by Facione (1990). In order to assess the students' perceived use of thinking skills for clinical decision making, these cognitive skills were

	1 2 3 4 5 6 7	
	Quite a lot **Confidence** **Very little**	
Thinking Skill	*Example Behavior*	*Your Rating*
Analyzing Information	The nurse demonstrates this thinking skill by analysing subjective/objective data including lab reports and diagnostic tests in order to determine what might be occurring in the patient. For example, the nurse may analyse that unilateral leg swelling and an elevated D-Dimer lab test may indicate a deep vein thrombosis. **How would you rate the care plan format for helping you with this process?**	
Making Connections	The nurse demonstrates this thinking skill by correlating information. For example, the nurse may correlate from pathophysiology that increased heart rate and blood pressure, which increases cardiac workload, may produce myocardial ischemia with resulting chest pain. **How would you rate the care plan format for helping you with this process?**	
Determining Relevance	The nurse demonstrates this thinking skill by reviewing the available patient data and deciphering which information is important to the situation. For example, when a patient has acute shortness of breath, the nurse can present to the physician the relevant physical exam and lab findings. **How would you rate the care plan format for helping you with this process?**	
Setting Priorities	The nurse demonstrates this thinking skill by determining which patient problem or need is most important. For example, the nurse identifies a number of nursing diagnoses or collaborative problems for a patient and determines the major problem that needs to be addressed first. **How would you rate the care plan format for helping you with this process?**	
Selecting Appropriate Information	The nurse demonstrates this thinking skill by choosing appropriate resources. For example, a patient may have a nasogastric (NG) tube requiring a medication through the tube. In this case, the nurse selects the information from the nursing skills text and agency manual. The nurse may also access the evidence-based guideline for properly checking NG placement. **How would you rate the care plan format for helping you with this process?**	
Applying Relevant Knowledge	The nurse demonstrates this thinking skill by using knowledge and relevant information to determine specific patient care interventions that would attain, maintain, or retain optimum patient health. For example, the nurse assesses high risk behaviors for acquiring HIV in a patient and then implements a teaching plan to eliminate risk. **How would you rate the care plan format for helping you with this process?**	
Evaluating Outcomes	The nurse demonstrates this thinking skill by effectively assessing achievement of specific goals within a problem-solving situation. For example, the nurse determines that a type 1 diabetic patient has not met an outcome for care when the patient cannot self-administer insulin. **How would you rate the care plan format for helping you with this process?**	

Figure 1
Survey for rating care plan and journal formats.

examined within the framework of the nursing process as conceptualised by Wilkinson (1991). Seven cognitive thinking skills for nursing practice were selected for this investigation based on (1) Facione's (1990) report regarding critical thinking skills and (2) components of the nursing process. The operationalization of these two constructs is shown in Table 1.

The survey consisted of 14 questions that students rated using a seven-point scale with scores ranging from 1 = quite a lot of confidence to 7 = very little confidence. Each question focused on one of seven critical-thinking skills and students were asked to rate their confidence for using that skill when completing the care plan format. Students also provided confidence ratings for using each of the seven thinking skills when completing the journal format. Inter-item correlations and reliability coefficients were acceptable for both the care plan (α = 0.870) and journal (α = 0.773) format surveys. The survey that students used to rate their perceptions when using each assignment format is depicted in Fig. 1.

Data analysis

The data were analysed with SPSS statistical package version 17 (SPSS for Windows, Inc, Chicago, IL, USA). Paired *t*-tests and Wilcoxon's matched pairs signed ranks were used to measure perceived confidence based on the seven critical-thinking skills between the care plan and journaling formats. To further examine observations, bivariate procedures measured any linearity between mean scores for the two assignment formats categorised by self-reported grade point average, hours worked and time to assignment(s) completion. Descriptive statistics were also examined. An alpha level of 0.05 was used for all statistical tests.

Results

Tables 2 and 3 show that respondents primarily resided on campus (62.7%) and held jobs (68.6%), working on average 9 hours per week. Mean self-reported grade point average was 3.19 [standard deviation (SD) = 0.341]. When asked to indicate their expected theory course grade, 68.7% indicated it as B or B–, whereas 62.8% indicated their expected clinical course grade as B+ or B. The average reported time to completion of the care plan format was 6.75 hours (SD = 4.31) and for the journaling format was 2.88 hours (SD = 1.48).

In Table 4, Overall, mean scores for the care plan format were relatively less favourable (mean = 3.41, SD = 1.13) than the journal format (mean = 2.29,

SD = 0.692). Within the care plan format, respondents were least confident in their ability to select appropriate information (mean = 3.84, SD = 1.53) and most confident in their ability to set priorities (mean = 2.78, SD = 1.30). With the use of the journaling format, respondents were most confident in their ability to make connections (mean = 2.04, SD = 1.06) and least confident in evaluating outcomes (mean = 2.49, SD = 1.16).

Table 4 shows that across all subjects, the respondents perceived confidence increased with use of the journaling format [t (50) = 5.67, P = 0.001]. Mean differences for all thinking skills were spread between 0.41 and 1.62 points. SDs for both format measurements revealed that the respondents' confidence was less variable with respect to analysing information, determining relevance and selecting appropriate information.

Results of Wilcoxon's analysis in Table 5 reveal that there was a statistically significant difference in how the care plan format was ranked versus the journaling format; ratings were consistently superior for the journal over the care plan format. Confidence was ranked

Table 2
Respondents' background characteristics (*n* = 51)

	N	*Mean*	*SD*
Age	50	20.32	0.55
GPA	50	3.19	0.34
Hours worked per week	33	8.78	5.67
Time to completion (hours)			
Care plan	51	6.75	4.31
Journal	51	2.88	1.48

GPA, grade point average.

Table 3
Other background characteristics (*n* = 51)

	N	*%*
Residence		
On campus	32	62.7
Off campus	19	37.3
Job		
Yes	35	68.6
No	16	31.4
Expected grade theory		
A	6	11.8
A–	5	9.8
B+	2	3.9
B	19	37.3
B–	16	31.4
C+	3	5.9
Expected grade clinical		
A	12	23.5
A–	4	7.8
B+	19	37.3
B	13	25.5
B–	1	2.0
C+	2	3.9

Table 4
Comparisons of differences in two assignment formats (*n* = 51)

	Care plan	Journal	Mean change	
Thinking skill	M (SD)	M (SD)	Mean ± SD	t
Analysing information	3.59 (1.62)	2.27 (0.89)	1.31 ± 2.00	4.67**
Making connections	3.67 (1.52)	2.04 (1.06)	1.62 ± 1.83	6.34**
Determining relevance	3.24 (1.45)	2.24 (0.99)	1.00 ± 1.72	4.15**
Setting priorities	2.78 (1.30)	2.37 (1.18)	0.41 ± 1.81	1.62
Selecting appropriate information	3.84 (1.53)	2.29 (0.99)	1.55 ± 1.97	5.60**
Applying relevant knowledge	3.43 (1.47)	2.33 (1.14)	1.09 ± 2.02	3.87**
Evaluating outcomes	3.31 (1.66)	2.49 (1.16)	0.82 ± 2.23	2.63*

*$P < 0.01$, **$P < 0.001$.

Table 5
Changes in perception of confidence (*n* = 51)

	Negative mean ranks	Positive mean ranks	z
Critical thinking skill			
Analysing information	23.92	13.75	3.96**
Making connections	23.49	12.83	−4.82**
Determining relevance	22.40	13.05	−3.67**
Setting priorities	17.86	21.38	−1.45
Selecting appropriate information	20.53	12.70	−4.48**
Applying relevant knowledge	21.26	19.94	−3.55**
Evaluating outcomes	21.98	18.88	−2.42*

*$P < 0.05$, **$P < 0.01$.

Table 6
Correlation coefficients for perceived confidence using two assignment formats

	Care plan	Journal
Grade point average	0.01	0.17
Hours worked	0.13	−0.16
Time to complete journal	0.01	0.16
Time to complete care plan	−0.01	0.15

Pearson's correlation coefficient (two-tailed).

highest in 37 cases with respect to analysing information using the journaling format over the care plan format. In 13 cases, the care plan format had higher ranks over the journaling format in regard to confidence in evaluating outcomes. As expected, rankings for setting priorities proved that the respondents' perceived confidence did not change with respect to assignment format, as 14 cases were tied in rank, suggesting further exploration of outlying factors.

As shown in Table 6, correlation coefficients were not significant. Upon examination of scatter plots, outliers were excluded from the analysis, suggesting a possible link as coefficients increased moderately between self-reported grade point average and mean time to complete the journal format ($r = 0.17$, $P > 0.05$). Negative correlations were found between the journal format and hours worked per week ($r = -0.16$, $P > 0.05$), and the care plan format and the time to complete the care plan ($r = -0.01$, $P > 0.05$). All other correlations were parallel. While measures for both formats were not significant, patterns of correlations were similar, showing no definitive links with the selected variables. Upon exploring the relationships among the independent variables, it was noted that there was a relationship between self-reported grade point average and having a job ($r = 0.29$, $P = 0.04$).

Discussion

Before this pilot study, students had not been introduced to the process of metacognition, that is, thinking about their own thinking, when developing a clinical assignment, even though educators agree that both cognitive and metacognitive skills are essential for the development of clinical reasoning skills (Kuiper & Pesut 2004). This project focused on illuminating students' skills to analyse information, determine relevance, make connections, set priorities, select appropriate information, apply pertinent knowledge and evaluate outcomes. In addition, the two types of assignments were compared based on how students perceived that they were able to use their thinking skills.

The study yielded interesting results. For example, the findings indicated that the students' confidence regarding six out of the seven measured thinking skills were significantly higher when using the journal format in comparison to the care plan format. Setting priorities was not significantly different between the journal format and care plan, possibly because of the requirements embedded in each assignment. With the care plan assignment, students were required to numerically rank order/prioritise every nursing diagnosis in their patient

interaction. For the journal, students were asked to discuss their first and most important priority of care and explain why it took precedence. Both exercises may have value in the care of patients; therefore, this thinking skill for nursing practice warrants further exploration.

An additional relevant finding was the time required for completing the two assignments. Students indicated their ability to complete the clinical journal in less than half the reported time required to complete the care plan (2.88 hours vs. 6.75 hours). Thus, having an assignment that effectively and efficiently achieves its purpose has merit. This finding has implications for students who are employed and may have limited time to complete assignments. For example, 65% of the students in the present study worked on average 9 hours per week. This finding supports the statistics that college student employment has been steadily increasing for at least four decades and, among students under the age of 24 at 4-year colleges, more than 50% are employed during the school year (Riggert *et al.* 2006). The significant and positive association that emerged between student grade point average and employment while at college provides support to the appeal of Riggert *et al.* (2006) for an ongoing examination regarding the impact of having a job on the college experience.

Although correlations in the present study between grade point average, hours worked and mean time to complete an assignment format were not significant, replication of the study design with a larger, more diverse sample would be of interest. In this study, 98% of the students were female and ranged in age from 20 to 22 years, whereas demographic trends in nursing show more nurses entering practice at older ages (Gebbie 2009). Approximately 7.9% of registered nurses in the USA are male, larger proportions exist in the United Kingdom and Netherlands, at 10% and 23% respectively (Roth & Coleman 2008). Therefore, the exploration of age and gender differences in relation to assignment preferences for thinking skills merits investigation.

The present study relied on students' self-reported perceptions to identify the thinking skills they used. Reliability and validity of the results could be higher by also having clinical faculty assess and rate the thinking skills that students demonstrate within a clinical assignment and compare clinical faculty's perceptions with those of students. Also, use of qualitative and mixed methods may provide added information about how an assignment affected thinking skills within a nursing process framework. For example, interviews or focus groups might reveal additional aspects of thinking that are relevant to professional nursing practice and patient care, and further support quantitative findings.

Study Limitations

Limitations to the generalizability of these results include the facts that the convenience sample consisted of a relatively small, largely female, Caucasian population with a homogeneous age range between 20 and 22 years. With the cross-sectional nature of the study design, data collection commenced at one point in time and precluded students from appraising their self-reported thinking skills at multiple intervals and more closely to assignment completion. A longitudinal study design may have provided a more accurate and richer assessment of the learning and development of thinking skills by students. Furthermore, students completed the survey at the end of an academic semester, when they were faced with multiple stressors, such as the completion of course assignments, papers and final examinations. As a result of these factors, the students' engagement in participating in the survey may have been a low priority. Based on these limitations, the findings should be generalised with caution.

The instrument was designed to survey students on their perceived confidence to use seven thinking skills; therefore, not all of the core cognitive thinking skills or sub-skills based on Facione's (1990) report were assessed. Critical-thinking dispositions congruent with the ideal critical thinker were not appraised within this pilot study. Moreover, there may be other ways of thinking required for clinical reasoning that were not assessed and future research should be conducted to evaluate these approaches.

In the present pilot study, students were able to decide which assignment format they would complete for a given clinical experience. Although providing students a choice has reported pedagogical merit (Glasser 1997, Erwin 2003), this approach affected the possibility to control variables that might have influenced the results. For example, the complexity of a particular patient's condition for a care experience may have influenced a student's perception of using thinking skills when implementing one assignment format over another. In addition, students were exposed to writing care plans over two previous semesters; therefore, pre-existing perceptions regarding the prevailing assignment format might have factored into the results. Although every attempt was made to neutralise clinical faculty members' attitudes toward one assignment format versus the other, faculty perceptions might have influenced student per-

ceptions as well. Lastly, the investigators did not include the content of the journals and the care plans as part of this study and, thus, the complexity of the selected patients' health care needs remains unknown. This factor also may have influenced students' perceptions.

Conclusions and Implications for Nursing Management

This study provides evidence that nursing students were more confident and effective in utilising their thinking skills when developing an assignment in the journal format. Additional research is needed to measure the learning achieved from completing each type of assignment. Moreover, there is the need to extend the utilisation of research findings on instructional strategies and translation from the classroom into diverse, complex health care settings where patients receive care. Nurse educators working with managers and clinical staff are challenged by expanding new, creative opportunities to develop strategies that promote critical thinking and translate these skills into sound nursing practice. Managers are in key organisational positions to build the necessary infrastructure for a supportive and collaborative learning environment.

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