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**Measures that can be used to instill critical thinking skills in nurse prescribers**

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**Abstract**

Critical thinking is a pervasive skill that involves scrutinizing, differentiating, and appraising information and reflecting on the information gained in order to make judgements and inform clinical decisions. Studies inform us of the need for agreement on the approaches used to teach and measure critical thinking. Nurse prescribers undertake an advanced role that encompass the need to be able to make clinically based decisions about the appropriateness of a specific medication. This requires critical thinking attributes. A variety of teaching and learning approaches are offered which can be used by nurse educators to develop critical thinking skills in nurse prescribers.

Key words: nurse educator, nurse prescriber, teaching and learning strategies, critical thinking.

**Introduction**

The term critical thinking has been used to describe fundamental skills used by nurses for over a decade and yet a common understanding of the term and what it exactly means has yet to be achieved (Daly, 1998, Clarke & Holt, 2001). Even so, critical thinking is thought to be the hallmark of the effective practitioner (Chenoweth, 1980) and the graduate nurse (O'Neill & Dulhy, 1997). It is a component of decision-making and is a requirement of the competent practitioner and an essential element that underpins the development of nurse autonomy (Jones & Brown, 1991). Critical thinking is also a fundamental skill of the nurse prescriber ( DoH, 2002). It is a skill that should be fostered within any nurse prescribing educational programme.

The concept of critical thinking and its impact on nursing has been widely debated and as yet no discrete definition is available (Girot, 1995). Critical thinking is viewed as a "complex cognitive process requiring higher order thinking and application to decision-

making in practice" (Girot, 2000, p 289). Other pertinent aspects of critical thinking include, the "logical, reductionistic, rule driven, decision making process, similar in character to the nursing process" (Jones & Brown, 1991, p. 532).

However, the most cited definition is provided by The American Philosophical Association (1990). In their opinion critical thinking "is the purposeful, self-regulatory judgement which results in interpretation, analysis, evaluation and inference as well as explanation of the evidential conceptual, methodological, criteriological or contextual considerations upon which that judgement was based. Critical thinking is essential as a tool of inquiry. Critical thinking is a pervasive and self-rectifying human phenomenon" (American Philosophical Association, 1990, p 3).

The "ideal critical thinker is habitually inquisitive, well-informed, honest in facing personal biases, prudent in making judgements, willing to consider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in selection of criteria, focused in inquiry and persistent in seeking results which are precise as the subject and circumstances of inquiry permit" (Facione, 1990, p2 ).

Key elements essential to critical thinking have been identified and include: identifying and challenging assumptions, exposing assumptions for accuracy and validity, identifying the context relevant to critical thinking (Brookfield, 1987) and having a "heightened awareness of how assimilated assumptions shape their perceptions, understandings and interpretations of the world" (Boychuk Duscher 1999, p. 580).

Simpson & Courtneay, (2002) in their review of the literature on critical thinking identified the characteristics that a critical thinker may possess, these include:

- Open mindedness, having the ability to appreciate alternative perspectives and different opinions.
- Being inquisitive, having a desire to investigate new things to gain knowledge and understanding.

- Truth seeking, sufficiently inquiring to gain new insights.
- Analytical in one's approach to critiquing evidence and the inferences that can be drawn from the evidence.
- Uses an organised and meticulous approach to problem solving.
- Self-confident with self awareness of own individual ability to utilize and critique available scientific evidence to inform decisions (Simpson & Courtneay, 2002).

Brookfield (1987) would add that the critical thinker would also undertake dialectical thinking, as this focuses on understanding and resolving contradictions and ability to undertake judgemental reflection. Liimatainen et al., (2001) view judgemental and evaluative reflection as inherent characteristics of the experienced practitioner who is confident to reflect on practice and its ramifications. Critical thinking is also associated with "knowledge, active argumentation, reasoning, initiative, intuition, application, analyzing complex meanings, identification of problems, envisioning alternatives and making contingency-related value judgements" (Simpson & Courtneay, 2002, p. 93).

The development of critical thinking skills takes time and is dependent on exposure to specific theoretical content, and the use of creative teaching and learning approaches (Girot, 1995).

Banning, (2004) found that in a group of 37 nurses studying to become independent nurse prescribers, only 2 nurses possessed critical thinking skills. This may have been due to the limited use of process-oriented teaching methods (Fraser & Greenhalgh, 2001), an over-reliance on self-directed study as a teaching and learning strategy or the lack of comprehension of the concept of critical thinking by the nurse educators involved in teaching. Nurses on this programme were clinically experienced professionals but many were academically immature learners and had limited comprehension of applied pharmacology and therapeutics. Due to these problems, nurse prescribers required more focused teaching to help develop comprehension of the complex nature of medication management (Banning, 2004b). In addition, many nurses were academically weak and

relatively inexperienced in literature searching, literature retrieval and critiquing skills which are fundamental to inquiry-based learning. A large percentage of the group lacked comprehension of the tenets of evidence-based practice and differences with evidenced-based medicine (Banning, 2004a). For nurse prescribers to function as critical thinkers, it is important to be able to search for, differentiate and analyse complex evidence in order to diagnostically reason, decipher the best management approach and in doing so, explore the benefits and disadvantages of using a particular medication for a specific patient.

Critical thinking is a salient feature of the facilitative methods of teaching and learning (Gilmartin, 2001). Nurse educators teaching on nurse prescribing courses need to be familiar with and encourage the use of facilitative methods of teaching and learning, in particular creative pedagogy (Banning, 2004). The adoption of creative pedagogy as a teaching and learning approach can encourage the use of process oriented teaching methods (Fraser & Greenhalgh, 2001) and transformational and situational teaching and learning approaches. This will add to the creation of a teaching and learning programme that reduces the dichotomy between professional knowledge and university knowledge and assists nurses studying to become nurse prescribers to appreciate the importance of both knowledge forms (Banning, 2004).

**Instructional methods to develop critical thinking in nurse prescribers**

Even though the term critical thinking is widely used in nursing literature, adopted in clinical practice (Koch, 1997), in educational programmes (Ribbons, 1998, Loving, 2000) and has been the focus of research projects (Girot, 2000, Ip et al., 2000, Daly, 2001). In the US, Loving, (2000) used Paul's model (Paul, 1995) as a framework for the integration of critical thinking skills in nursing courses. The framework served as a common tool to assist nurse educators in their choice of teaching and learning strategies. Infusing the framework within courses, encouraged nurse teachers to evaluate the teaching and learning strategies, in particular the predominant use of didactic approaches.

In the US, nurse educators have used decision-making pathways, debates and case studies to develop critical thinking skills in students of small group sizes (Pond et al., 1991,

White et al., 1990). With larger group sizes, Elliott (1996) used the following teaching and learning strategies to promote information processing and metacognitive skills in nursing students:

- A meaningful learning approach to teaching in an effort to inform students of the relevance of the material to be covered with opportunities for vicarious learning.
- Structured note taking with suggestions that students leave a margin beside their notes to allow them to review points raised after the teaching session has finished.
- The use of co-operative learning techniques such as think-pair where two students actively to respond collaboratively to reply to structured questions and to compare answers provided by other group members.
- Use a round robin which is the use of group work in a lecture theatre, where students in groups of four formulate answers to a specific question, compare answers and their derivation, then the group formulate a group response which is then presented to the whole class where discussion of responses can be generated.
- Design a jigsaw. This technique is based on small group work with students preparing components of a module assignment. The assignment is treated as a jigsaw puzzle with each group working collaboratively to prepare their part of the jigsaw puzzle. Students then teach their peers on the theoretical relevance of their component of the jigsaw. The students will therefore share information, learn from each other and have an awareness of all components of the assignment.
- Conduct a Plus Minus Interesting point relevant to a statement (PMI). This is a critical thinking strategy that is useful for exploring controversial issues on which students may have opinions. Ask students to conduct a PMI for a specific issue. The goal is to prepare a large list of PMIs then give student's opportunities to list their researched PMIs and then critically discuss the lists provided.

- Provide closure. At the end of each teaching session, ask the students to create a list of the two most important things that they have learned and to develop at least one question that they would like to research related to the topic areas they have been taught in the teaching session.

In the UK, there is a need for educational institutions to define and share views on critical thinking in relation to their nursing curricula (Seymour et al., 2003), identify an assessment tool (Adams et al.,1996), and teaching and learning strategies that help to anneal critical thinking in the practice context (Girot, 2000, Daly, 2001). Above all, nurse educators teaching and assessing critical thinking must be familiar with its characteristics and provide suitable exemplars during teaching (Seymour et al., 2003).

The following approaches are offered as tools to assist the development of critical thinking in nurse prescribers who may possess a considerable amount of clinical experience but are often academically immature and yet are expected to perform advanced roles.

**Concept Mapping**

Concept mapping can be viewed as both an educational tool and a research method (Irvine, 1995). As a learning tool, concept mapping can be used to create a visual impression of the current knowledge a student may possess on a particular subject and be used as a tool to show the complexity of a given topic, theoretical interrelations at a given level and association with other topics. For example, the use of $\beta_2$ agonists for the treatment of asthma. A student may produce a concept map that includes the aetiological factors and presenting signs and innate symptoms commonly found in a patient with asthma. The use of $\beta_2$ agonists may be mapped as a reliever of the bronchospasm and hyperresponsiveness experienced by patients. Following a period of theoretical instruction, students are encouraged to re-visit the previously prepared concept map to explore whether they can add to the map plotted out and can address areas in which their knowledge has developed further. The revised concept map may present new information that again visualizes the conceptualization of knowledge of a particular subject held by

the student. Revisiting asthma, new knowledge may be in the form of identifying the main pathophysiological mechanisms that underpin asthma and with a help of a diagram illustrate the mechanism of action of $\beta_2$ agonists and the reversal of bronchospasm or a review of the most frequently experienced side effects and the evidence to support the use of drug.

During concept mapping, the lecturer acts as a facilitator questing students reasoning behind the conceptual maps created and assisting students to make the links between the items plotted on the map. As a facilitator of learning, the lecturer acts a resource (Haith-Cooper, 2000, Gilmartin, 2001), probing and questioning to challenge the theoretical propositions and to make the connections between theory and research. In doing this, the lecturer will encourage meaningful learning (Marton & Säljö, 1997). Concept mapping utilizes Vygotskian principles to promote activities such as deep learning and creative and critical thinking (Vygotsky, 1935, Gendrop & Eisenhauer, 1996).

**Think aloud seminar**

Lee & Ryan-Wenger (1997) explored the use of the 'think-aloud' seminar as a teaching tool to instill clinical reasoning skills in paediatric nurse practitioner students. The seminar focused on the presentation of a case study of a child with pharyngitis. Paediatric nurse practitioner students were expected to ask relevant questions regarding the presenting signs and symptoms and exclude underlying pathologies based on the presentation and their knowledge of potential pathophysiology. This process of exclusion of potential diagnoses aids the critical thinking by encouraging the student to openly verbalise the rationale behind their thoughts and opinions about the case. This approach can encourage student participation, particularly diffident students (Loving, 2000). By a process of exclusion, the student should develop a definitive diagnosis and gain skills in problem-solving and critical–creative thinking (Bethune & Jackling, 1997, Daly,1998, Seymour et al., 2003).

This teaching and learning approach can be used to develop critical thinking skills of nurse prescribers by exploring conditions that they will actually prescribe medication for.

The approach can use either an actual patient or by using a retrospective case which provides a specific amount of information with relevant pathophysiological questions as a guide to assist differentiation between pathophysiological conditions and to aid critical exploration and development of diagnoses (Banning, 2004).

**Simulation**

Wong & Chung, (2002) used simulation as a teaching and learning method to develop diagnostic reasoning skills in pre-registration nursing students. Diagnostic reasoning "is a component of clinical decision-making and involves the recognition of cues and analysis of data in clinical situations" (Wong & Chung, 2002, p. 66). Diagnostic reasoning involves a continuous process of information processing in order to develop a solution for a given problem. Wong & Chung, (2002) used Biggs Study Process Questionnaire (Biggs, 1992) to establish whether students used a surface or deep strategy to process information from three scenarios of varying complexity; managing a patient with a peptic ulcer, identifying hypoglycaemia and managing a patient with shortness of breath. A computerised control patient simulator was used which allowed students to perform nursing procedures (hear heart and chest sounds, feel the carotid pulse, assess movement of arms, administer oxygen to the patient) and talk to the simulator in order to replicate a real clinical situation. Students were asked to make a differential diagnosis for each of the scenarios as a measure of clinical decision making.

The use of patient simulation has also been used as a teaching and learning role in anaesthetists' education (Devitt et al., 1998). The patient simulator could be used as a teaching and learning approach could be an excellent method of developing information processing, diagnostic reasoning and critical thinking skills in nurse prescribers (Banning, 2004). Ribbons, (1998) used computer simulation to develop higher order thinking skills in undergraduate nurses.

**Patient profiling**

This teaching and learning approach would involve the nurse educator presenting a putative patient and describing the clinical symptoms to a group of students. The clinical case would be a patient with a condition that the students would be expected to manage as a nurse prescriber. Students would then investigate the literature and other sources of evidence to develop a potential diagnosis. Based on the information presented, students would be expected to question the symptoms, probe for clues to the probable diagnosis, and differentiate the formative diagnoses with reference to underpinning physiology, altered physiology and knowledge of a normal physical examination. At the next meeting, the nurse educator would expect the students to probe and question the presenting symptoms, request information from potential diagnostic investigations and pathophysiological reports. Using this information and their knowledge of altered physiology and physical examination, and sources of evidence from clinical studies, case analysis and randomized controlled trials, students would be expected to articulate a coherent rationale for the diagnosis offered.

Using this approach, students would be expected to use their clinical experience and clinical knowledge to develop a formative diagnosis which will help to drive their intuition to investigate relevant aspects of the presenting symptoms and to search for, analyse, synthesize, evaluate and reflect on the supporting clinical evidence to help formulate a cohesive rationale for the presenting symptoms. This approach will assist students who have initiative and the intrinsic motivation to develop analytical, evaluative and metacognitive and diagnostic reasoning skills.

**Drug diary**

The drug diary involves the individual collection of evidence relevant to medicines. Students would be expected to undertake an in-depth exploration of a group of medicines used to manage a particular condition, e.g. dyspepsia. In this example, the student would search for evidence such as drug information profiles, randomized controlled trial data, research studies, patient management studies and NICE guidelines relevant to the use of alginates, $H_2$ receptor antagonists such as cimetidine, and famotidine, proton pump inhibitors such as omeprazole and the prokinetic agent metoclopramide. Students would

be expected to possess an underpinning knowledge of the normal and altered physiology of the gastro-intestinal tract with reference to the stomach and oesophagus in order to be able to explain the presenting symptoms of dyspepsia. Comprehension of the common aetiological symptoms would also be expected. Students can present the group of drugs in a seminar with critical analysis and supporting rationale for the usefulness and benefits of each drug type to the resolution of potential symptoms, potential disadvantages and associated contra-indications. The analysis presented in the seminar would be supported by critique of current evidence and could be used as a medication management assignment.

**Research trail**

Students are taught critiquing principles in the classroom, but often have limited experience of sharing research with knowledgeable colleagues within the practice environment or adapting these principles independently (Seymour et al., 2003). A research trail would involve a group of students researching different aspects of a selected patient care management problem. Each student would identify and research one aspect of the problem, prepare a short presentation of the evidence found and prepare a short summary sheet for the other group members. With each presentation, the evidence available will guide and inform the other group members on the intricacy of the patient care management problem. The lecturer practitioner can act as a resource, guide, researcher and educator and help to inform, compare practices and to apply the salient aspects of the patient care management problem to clinical practice. Although this may be viewed as a resource intensive approach, by using this method, students can develop skills in literature reviewing and retrieval, analysing and differentiating research findings, and evaluating and reflecting on patient management perspectives.

**Conclusions**

Critical thinking is an invaluable skill that differentiates the proficient practitioner from the less capable practitioner. Nurse educators are in a prime position to develop these skills in nurses and nurse prescribers. A variety of teaching and learning approaches are used that could be used to develop analytical, diagnostic reasoning, research evaluation

and judgemental reflective skills. One could argue that critical thinking skills should be an inherent characteristic of any nurse prescriber.

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