



RESEARCH ARTICLE

STIMULATE REFLECTION AND FOSTER CRITICAL THINKING IN NURSING EDUCATION

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ABSTRACT

With the increasing critical thinking (CT) and reflection of baccalaureate nursing students for nursing practice, faculty members are incorporated it into their curriculum and clinical judgment and recognize it as an essential component and outcome of education. Yet, there is little consensus on the meaning and application of CT in nursing. The purpose of this paper is to define the evolution of critical thinking and reflection; describe characteristics of critical thinkers, approaches to teaching CT skills in the classroom and clinical practice; identify strategies to teach critical thinking skills, assessment of critical thinking methods and available tools, validity and reliability issues, and identify strategies to evaluate critical thinking skills based on reviewing articles from PubMed and CINAHL. The complexities of teaching these skills, educators need to evaluate the impact of education process and design, and continue to develop and implement curriculum. Intervention studies should be designed to investigate educational approaches.

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INTRODUCTION

Nursing literature and the National League for Nursing has been emphasized the concept of critical thinking as important for nursing education and for practicing registered nurses (Vacek, 2009). There is little consensus on the meaning and application of CT in nursing, focusing on critical thinking as a process of thinking involves being proactive, collaborative, and quality oriented that incorporates decision making and global system thinking (Forneris, 2004). Critical thinking (CT) was core culture of the educational reform in a global phenomenon since 2004. The concept of CT is an important competency for nursing education and for practicing registered nurses (Vacek, 2009). Studies have investigated the relationship between critical thinking and clinical decision making (Carter *et al.*, 2017, Lake and McInnes, 2012), clinical competence (Hoffman and Elwin, 2004, Muller-Staub, 2006, Shin *et al.*, 2006), ethical discourse (Hough, 2008), and learning styles (Andreou *et al.*, 2014). Nurse educators are therefore encouraged to evaluate courses and to ascertain whether critical thinking is reflected in exploring teaching approaches to promote effective clinical teaching, active learning, and foster critical thinking because critical thinking must be fostered for all learners is evident (Ellermann *et al.*, 2006, Myrick, 2002, Shin *et al.*, 2006, Vachon *et al.*, 2009).

However, there is little consensus on the meaning and application of CT in nursing, focusing on critical thinking as a process of thinking that incorporates decision making and global system thinking (Forneris, 2004) as well as needing to development the cognitive skills (Carter *et al.*, 2017). The purpose of the paper based on reviewing articles from PubMed and CINAHL to define the evolution of critical thinking and reflection, describe approaches to teach critical thinking skills in the classroom and in the clinical practice, identify strategies to teach critical thinking skills, assess critical thinking, and identify strategies to evaluate critical thinking skills.

Defining critical thinking in nursing

Dewey proposed that critical thinking was exploring different options on an issue by probing, discriminating, and testing idea (Dewey, 1910). Evidence presented that nurse students recognize the world around by Dewey's educational strategies of experiential learning, reflection, and reciprocal learning (Dewey, 1938) to make social justice and collaborative partnerships through service learning (Brown, 2017, Schmidt and Brown, 2016). Huan & Vickie (2008) pointed out that CT was inner motivation to solve problems and make decisions. CT is the mental process of inquiry ability and habit that facilitate creative of thought, reasonable reflective thinking is a continuous self-inquiry for every project or causal relationship between events and self-regulatory judgment to decides what to believe or action to reach sense of civic responsibility and increase sensitivity of cultural diversity (Groh *et al.*, 2011,

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Kohlbray, 2016, Schmidt and Brown, 2016). Critical thinking and self-regulation operates in a dynamic interactive system of teaching and learning (Phan, 2010). Currently, more studies used definition of critical thinking as meaningful, unbiased decisions or judgments that apply the evidence of interpretation, analysis, evaluation, inferences, and explanations of information to a specific discipline (Facione, 2010). Most models of critical thinking are addressed (Baker, 2001, Facione *et al.*, 1994, Ford and Profetto-McGrath, 1994, Kataoka-Yahiro and Saylor, 1994) that propose using reflection, judgment, action of mind, and cognitive in critical thinking, which affective dispositions to think critically include inquisitiveness, truth-seeking, open-mindedness, self-confidence, systematicity, analyticity, and maturity (Suliman, 2006). Lately, Jacobs (Jacobs, 2013) proposed innovative professional practice model that adapted of Carper's pattern of knowing into nursing metaphors of science, ethic, art, and advocacy; reflected of integrating organization values of caring, safety, integrity, and excellence; and integrated with nursing research including inquiry, introspection, imagination and creativity, and innovation. All of those reflections promote the discourse to stabilize and reconcile nursing.

Defining of reflection and how might reflection help develop critical thinking

Goldsmith defined "reflection as the act of reviewing events with an eye to extracting meaning" that contained continuous, connected, challenge, and contextualized (Center for Service-Learning, 1991). Dewey defined four criteria of reflection including "reflection as a meaning making process, a rigorous way of thinking, community, and a set of attitudes" (Rogers, 2002). However, it needs to open-mindedness and willingness to listen to others and act upon criticism (Dewey, 1933). Reflective thinking in nursing included analyzing, synthesizing, and evaluating of patients' care and making decision what to do was appropriate (Glaze, 2002). Reflective practice is practitioners deal with illness and work with the perceptions of others and usually ascribe meanings to signs/symptoms, treatment, and health promotion (Cioffi, 1997). Reflection in nursing has been described as thoughtful, innovative and critical practice that assists nurses to inquiring event of cause-effect and integrate the hidden knowledge, beliefs, and values (Graham *et al.*, 1998), which is needed to self-reflection, prevent stagnation and thoughtless repetition of nursing care (Andrews *et al.*, 1998), where practitioners need to adapt to fit job role, continuous learning and disciplining is required. A reflective nurse may pass through self-absorption, forgetting oneself, self-identity to self-awareness and personal agency, then, he/she possesses of directness to observe mental responses of the patient (Helyer, 2015).

This based on experiences, feelings, senses, emotion, and with their activities of thought and achievements. Multiple response will produce an ongoing process where questioning, acting, thinking, and collaborating are brought together on looking back, and encourage debate around making sense of a situation and its outcomes, as well evaluate what else could have been done and done better in the future. There are six stages in reflective learning process for decision making to change their perspective: introspection, concept attainment, self-attribution, problem solving, action planning and reorganization (Vachon *et al.*, 2009). The major influence factors of reflective learning are sharing experience, normative beliefs, coping with negative emotions, social support, perceived self-efficacy, and risk

taking (Vachon *et al.*, 2009). The benefit of reflection for nursing students is not only to review and make sense of experiences but also can be guided to improve clinical skills and promote professional growth and behaviors, as well as communicate with patients.

Approaches to teaching critical thinking skills

Nurse educators develop clinical judgment for aiding student's decision making that need to develop multiple pathways to achieve the goal of nursing education. Inquiring learning of students should help them to view phenomena and experience by reflective writing, to ask question, to be awareness of the frame, to examine results of decision, and to plan for future action. Paul-Elder critical thinking model includes standards, elements of reasoning, and intellectual traits that can help students and faculties to create in their reflective journals (Paul and Elder, 2010). The standards of critical model were accuracy, breadth, clarity, depth, fairness, logic, precision, significance, and relevance. The element of reasons were purpose, question, information, interpretation/inference, concepts, assumptions, implications/consequence, points of view. The intellectual traits were intellectual humility, autonomy, integrity, courage, perseverance, and empathy; confidence in reason; and fairmindedness (Naber and Markley, 2017). Depending above three steps model provide learners and teachers to know how keep reflection of reality practice and improve their cultural competence through critical reasoning with intelligence trait. Nurse students shared their critical incident and reflective journal writing that can promote to improve their analysis of their learning experience in their own practice to reflect on their actions ongoing clinical situations, even encourage to recognition of a challenging practice situation.

Strategies to teach critical thinking skills

Various teaching strategies include writing assignments to encourage the development of dialectic reasoning and spontaneous group dialogue to stimulate useful discussions (Robertson and Rane-Szostak, 1996, Wade, 1995), critical conference, service learning, role play, videotaped vignettes, preceptor-ship have been evidenced that promote critical thinking (Vacek, 2009). Mun (2010) asked students to document their everyday experience by narratives that were analyzed and interpreted from the philosophical notion of hermeneutics. Concept maps in the clinical setting that applied critical thinking to improve clinical preparedness (Hicks-Moore and Pastirik, 2006, King and Shell, 2002) encourages students to analyze and learn from reflection and critical thinking around complex issues (Kowalczyk *et al.*, 2012, Plack *et al.*, 2010). The teacher prepares questions to lead students through a case study/discussion and uses reader's questions that required students to write questions on reading and turning them in at the beginning of class (McDade, 1995), which questioning strategies include write questions about the lecture material (King, 1995) to develop critical thinking, decision making, and problem solving in students (Delward, 2010).

Assessing critical thinking: methods & available tools

The outcome measures in students' perceptions of change in critical thinking include the Watson-Glaser CT Appraisal (WGCTA), the California Critical Thinking Skills (CCTST), and the California Critical Thinking Dispositions Inventory

(CCTDI) (Yuan *et al.*, 2008). There were no consistent evidences in twenty CT research studies in nursing using the WGCTA was a standardized, assessment tool for measuring CT skills of five abilities: inference, deduction, recognition of assumption, interpretation, and evaluation of arguments (Watson and Glaser, 1980). There are various forms of this test, including Form S (16 scenarios and 40 items), Form A and B consisted of 80-items which scores ranged from 1 to 80 (Watson and Glaser, 1994). The internal consistency and test-retest for the WGCTA-FS are both .81-0.89 (Watson and Glaser, 2012), the split-half reliability coefficients ranged from .69 - .85 (Watson and Glaser, 1994). Reliability of the WGCTA is reported as .74 to .81 (Watson and Glaser, 1980) and for the WGCTA-Form S(FS) ranged from .74 to .92 in different academic groups (Gadzella *et al.*, 2006). The CCTST, 34 multiple-choice test items, is targeted to evaluate the development of CT skills in students in the BSN curriculum which consists of 7 subscales, measuring judgment of the reliability of statements, analysis, deductive and inductive reasoning, identification of faulty reasoning, and evaluation (Spelic *et al.*, 2001). The reliability coefficient between the CCTST pretest and posttest for the treatment group was .62 and .95 for the control group (Brunt, 2005). The Kuder-Richardson-20 reliability ranged from .60 to .78 (Facione, 1994, Myrick, 2002).

The CCTDI was a 6-point Likert scale consisting of 75 Likert-style items to measure the CT dispositions of truth-seeking, open-mindedness, analyticity, systematicity, confidence, inquisitiveness, and maturity (Walsh and Hardy, 1999, Walsh and Hardy, 1997) that may be useful to nurse educators in the assessment and planning of specific curriculum development and in counseling individuals (McCarthy *et al.*, 1999). Facione (1994) found that overall alpha coefficient was .90. The Cronbach's alpha value for the total CCTDI was .90 with .60 to .78 on the subscales (Facione, 1994), and other authors reported were .83 (Wangensteen *et al.*, 2010), .85 (Ozaturk *et al.*, 2008), and .89 (IP *et al.*, 2000). Lower subscales values also were presented. Kawashima and Petrini (2004) proposed in their study that low alpha Cronbach values might be cultural biases.

Strategies to evaluate critical thinking skills

Angel, *et al.* (2000) recommended that faculty should be encouraged to use an evidence-based model to examine their curricular decisions regarding teaching methodologies to attain educational goals for improving both knowledge acquisition and critical-thinking performance. Wheeler & Collins (2003) compared the use of concept maps and traditional nursing care plans in developing CT skills, there was no significant group differences in overall CCTST scores. Howenstein, Bilodeau, Brogna, & Good (1996) used the WGCTA in acute hospital nurses to find a positive correlation between level of education and CT skills, but a negative correlation between CT skills, age, and years of experiences. Hicks, Merritt, & Elstein (2003) studied the relationship between levels of education, years of critical care nursing experience, CT skills and dispositions, and decision making consistency in register nurses from 3 hospitals. Jenkins (1998) used WGCTA scores to be predictive of success in a class of undergraduate students and suggested that it could be applied to graduate students. McCarthy, Schuster, Zehr, & McDougal (1999) found significant increases in CCTST and CCTDI scores from the sophomore to senior years of BSN students in the United States, the groups

differed significantly on the CCTDI subscales of truth-seeking, confidence, analyticity, and inquisitiveness. Total and subscales scores from the CCTDI demonstrated low correlations with the CCTST total score and other measures of thinking and reasoning skills (Stone *et al.*, 2001). But, Steward and Dempsey (2005) reported no significant differences in CCTDI scores from sophomore to senior years of BSN students. No studies examining a relationship between the WGCTA and the CCTDI in the literature review. Salsal *et al.* (Salsali *et al.*, 2013) review's study stated that had differences in subscales of critical thinking in nursing students between Asian countries and non-Asian countries that CCTDI might be appropriated to Western social customs.

Implication for practice, nursing education, and research

More employers are seeking nurses who can think critically, reconsider curriculum because of changing context, including funding, changing health care system, and changing health profile of the populations we serve, and workforce shortages emerging and continuing over next decades. The nursing shortage 2020 will be including deepening shortage of faculty for school of nursing; projected shortage of leaders with academic preparation for their roles in clinical services; anticipated shortage of leaders in research, and the leadership shortage are not being adequately addressed. The complexities of teaching these skills and educators need to evaluate the impact of education process and design. The positive outcome are encouraging to faculty and serve to reinforce the decisions made in regard to teaching-learning and outcomes evaluation processes. The research should be replicated in a sample population that encompasses the continuous of novice to expert when valid measures of critical thinking and cognitive development have been developed for nursing education and clinical practice. Intervention studies should be designed to investigate educational approached that promote critical thinking and cognitive develop or critical judgment. In summary, assessment of critical thinking skill development in nursing curricula requires careful attention to instrumentation, outcomes research design, and procedures.

REFERENCES

- Andreou, C., Papastavrou, E., Merkouris, A., 2014. Learning styles and critical thinking relationship in baccalaureate nursing education: A systematic review. *Nurse Education Today* 34 (3), 362-371.
- Andrews, M., Gidman, J., Humphreys, A., 1998. Reflection: Does it enhance professional nursing practice? *British Journal of Nursing* 7 (7), 413-417.
- Angel, B.F., Duffey, M., Belyea, M., 2000. An evidence-based project for evaluating strategies to improve knowledge acquisition and critical-thinking performance in nursing students. *Journal of Nursing Education* 39, 219-228.
- Baker, D.C., 2001. Nursing reasoning model. *Nurse educator* 26 (5), 203-204.
- Brown, C.L., 2017. Linking public health nursing competencies and service-learning in a global setting. *Public Health Nurs* 11 (10), 12330.
- Brunt, B.A., 2005. Models, measurement, and strategies in developing critical-thinking skills. *Journal of Continuing Education in Nursing* 36 (6), 255-262.
- Carter, A.G., Creedy, D.K., Sidebotham, M., 2017. Critical thinking skills in midwifery practice: Development of a self-assessment tool for students. *Midwifery*. 50:184-192.

- (doi), 10.1016/j.midw.2017.1004.1010. Epub 2017 Apr 1027.
- Center for Service-Learning, 1991. What is service-learning? National Youth Leadership Counsel.
- Cioffi, J., 1997. Heuristics, servants to intuition, in clinical decision making. *Journal of Advanced Nursing* 26 (1), 203-208.
- Delward, L., 2010. Building pedagogical intelligence in allied health: A primer. *Internet Journal of Allied Health Sciences and Practice* 8 (3), Article 7.
- Dewey, J., 1910. *How We Think?* Heath & Co, New York: D.C.
- Dewey, J., 1933. *How we think: A restatement of the relation of reflective thinking to the educative process.* DC Heath and Company, Lexington, MA.
- Dewey, J., 1938. *Experience and education.* Macmillan, New York.
- Ellermann, C.R., Kataoka-Yahiro, M.R., Wong, L.C., 2006. Logic models used to enhance critical thinking. *Journal of Nursing Education* 45 (6), 220-227.
- Facione, N., 1994. Critical thinking disposition as a measure of competent clinical judgment: The development of the California Critical Thinking Disposition Inventory *Journal of Nursing Education* 33, 345-350.
- Facione, N.C., Facione, P.A., Sanchez, C.A., 1994. Critical thinking disposition as a measure of competent clinical judgement: The development of the California Thinking Disposition Inventory. *Journal of Nursing Education* 33 (8), 345-350.
- Facione, P.A., 2010. Critical thinking: What it is and why it counts. In: *Insight Assessment.* California Academic Press, Millbrae, CA, pp. 1-23.
- Ford, J.S., Profetto-McGrath, J., 1994. A model for critical thinking within the context of curriculum as praxis. *Journal of Nursing Education* 33 (8), 341-344.
- Forneris, S.G., 2004. Exploring the attributes of critical thinking: A conceptual basis. *International Journal of Nursing Education Scholarship* 1, Article9.
- Gadzella, B.M., Hogan, L., Masten, W., Stacks, J., Stephens, R., Zascavage, V., 2006. Reliability and validity of the Watson-Glasere Critical Thinking Appraisal-Forms for different academic groups. *Journal of Instructional Psychology* 33 (2), 141-143.
- Glaze, J.E., 2002. Stages in coming to terms with reflection: Student advanced nurse practitioners' perceptions of their reflective journeys. *Journal of Advanced Nursing* 37 (3), 265-272.
- Graham, I., Waight, S., Scammell, J., 1998. Using structured reflection to improve nursing practice. *Nursing Times* 94, 56-59.
- Groh, C.J., Stallwood, L.G., Daniels, J.J., 2011. Service-learning in nursing education: its impact on leadership and social justice. *Nurs Educ Perspect.* 32 (6), 400-405.
- Helyer, R., 2015. Learning through reflection: The critical role of reflection in work-based learning. *Journal of Work-Applied Management* 7 (1), 15-27.
- Hicks, F.D., Merritt, S.L., Elstein, A.S., 2003. Critical thinking and clinical decision making in critical care nursing: A pilot study. *Heart Lung* 32 (3), 169-180.
- Hicks-Moore, S.L., Pastirik, P.J., 2006. Evaluating critical thinking in clinical concept maps: A pilot study. *International Journal of Nursing Education Scholarship* 3 (1), 1314-1341.
- Hoffman, K., Elwin, C., 2004. The relationship between critical thinking and confidence in decision making. *Australian Journal of Advanced Nursing* 22 (1), 8-12.
- Hough, M.C., 2008. Learning, decisions and transformation in critical care nursing practice. *Nursing Ethics* 15 (3), 322-331.
- Howenstein, M.A., Bilodeau, K., Brogna, M.J., Good, G., 1996. Factors associated with critical thinking among nurses. *Journal of Continuing Education in Nursing* 27 (3), 100-103.
- Huan, Z., Vickie, L., 2008. Critical thinking dispositions and learning styles of baccalaureate nursing students from China. *Nursing and Health Sciences* 10, 175-181.
- IP, W.Y., Lee, T.E., Lee, F.K., Chau, P.G., Wootton, S.Y., Chang, A.M., 2000. Disposition towards critical thinking: A study of Chinese undergraduate nursing students. *Journal of Advance Nursing* 32 (1), 84-90.
- Jacobs, B.B., 2013. An innovative professional practice model: adaptation of Carper's patterns of knowing, patterns of research, and aristotle's intellectual virtues. *ANS Adv Nurs Sci* 36 (4), 271-288.
- Jenkins, E.K., 1998. The significant role of critical thinking in predicting auditing students' performance. *Journal of Education Business* 73 (5), 274-279.
- Kataoka-Yahiro, M., Saylor, C., 1994. A critical thinking model for nursing judgment. *Journal of Nursing Education* 33 (8), 351-356.
- Kawashima, A., Petrini, M.A., 2004. Study of critical thinking skills in nursing students and nurses in Japan. *Nurse Education Today* 24, 286-292.
- King, A., 1995. Designing the instructional process to enhance critical thinking across the curriculum: Inquiring minds really do want to know: Using questioning to teach critical thinking. *Teaching of Psychology* 22 (1), 13-17.
- King, A., Shell, R., 2002. Teaching and evaluating critical thinking with concept maps. *Nurse Educator* 27 (5), 214-216.
- Kohlbray, P.W., 2016. The Impact of International Service-Learning on Nursing Students' Cultural Competency. *J Nurs Scholarsh.* 48 (3), 303-311. doi: 310.1111/jnu.12209.
- Kowalczyk, N., Hackworth, R., Case-Smith, J., 2012. Perceptions of the use of critical thinking teaching methods. *Radiologic Technology* 83 (3), 226-236.
- Lake, S., McInnes, R.J., 2012. Exploring cognitive skill development in midwifery education. *Nurse Educ Pract.* 12 (5), 264-268. doi: 210.1016/j.nepr.2012.1004.1015. Epub 2012 Jun 1019.
- McCarthy, P., Schuster, P., Zehr, P., McDougal, D., 1999. Evaluation of critical thinking in a baccalaureate nursing program. *Journal of Nursing Education* 38 (3), 142-144.
- McDade, S.A., 1995. Case study pedagogy to advance critical thinking. *Teaching of Psychology* 22 (1), 9-10.
- Muller-Staub, M., 2006. Clinical decision making and critical thinking in the nursing diagnostic process]. *Pflege* 19 (5), 275-279.
- Mun, M.S., 2010. An analysis of narratives to identify critical thinking contexts in psychiatric clinical practice. *International Journal of Nursing Practice* 16 (1), 75-80.
- Myrick, F., 2002. Preceptorship and critical thinking in nursing education. *Journal of Nursing Education* 41 (4), 154-164.
- Naber, J., Markley, L., 2017. A guide to nursing students' written reflections for students and educators. *Virginia Henderson Global Nursing e-Repository.*
- Ozaturk, C., Muslu, G.K., Dicle, A., 2008. A comparison of problem based and traditional education on nursing

- students' critical thinking dispositions. *Nurse Education Today* 28, 627-632.
- Paul, R., Elder, L., 2010. The Miniature Guide to Critical Thinking Concepts and Tools. *Foundation for Critical Thinking Press, Dillon Beach.*
- Phan, H.P., 2010. Critical thinking as a self-regulatory process component in teaching and learning. *Psicothema* 22 (2), 284-292.
- Plack, M.M., Driscoll, M., Marquez, M., Greenberg, L., 2010. Peer-facilitated virtual action learning: Reflecting on critical incidents during a pediatric clerkship. *Academic Pediatrics* 10 (2), 146-152.
- Robertson, J.F., Rane-Szostak, D., 1996. Using dialogues to develop critical thinking skills: A practical approach. *Journal of Adolescent & Adult Literacy* 39 (7), 552-556.
- Rogers, C., 2002. Defining of reflection another look at: John Dewey and reflective thinking. *Teachers College Record* 104 (4), 842-866.
- Salsali, M., Tajvidi, M., Ghiyasvandian, S., 2013. Critical thinking dispositions of nursing students in Asian and non-Asian countries: A literature review. *Global Journal of Health Science* 5 (6), 172-178.
- Schmidt, N.A., Brown, J.M., 2016. Service Learning in Undergraduate Nursing Education: Strategies to Facilitate Meaningful Reflection. *J Prof Nurs.* 32 (2), 100-106. doi: 110.1016/j.profnurs.2015.1006.1006. Epub 2015 Jun 1019.
- Shin, K.R., Lee, J.H., Ha, J.Y., Kim, K.H., 2006. Critical thinking dispositions in baccalaureate nursing students. *Journal of Advanced Nursing* 56 (2), 182-190.
- Spelic, S.S., Parsons, M., Hercinger, M., Andrews, A., Parks, J., Norris, J., 2001. Evaluation of critical thinking outcomes of a BSN program. *Holistic Nursing Practice* 15 (3), 27-34.
- Stewart, S., Dempsey, L., 2005. A longitudinal study of baccalaureate nursing students' critical thinking dispositions. *Journal of Nursing Education* 44 (2), 81-85.
- Stone, C.A., Davidson, L.J., Evans, J.L., Hansen, M.A., 2001. Validity evidence for using a general critical thinking test to measure nursing students' critical thinking. *Holistic Nursing Practice* 15, 65-74.
- Suliman, W.A., 2006. Critical thinking and learning styles of students in conventional and accelerated programmes. *International Nursing Review* 53 (1), 73-79.
- Vacek, J.E., 2009. Using a conceptual approach with concept mapping to promote critical thinking. *Journal of Nursing Education* 48 (1), 45-48.
- Vachon, B., Durand, M.J., Leblanc, J., 2009. Using reflective learning to improve the impact of continuing education in the context of work rehabilitation. *Advances in Health Sciences Education: Theory and Practice* 15 (3), 329-348.
- Wade, C., 1995. Using writing to develop and assess critical thinking. *Teaching of Psychology* 22, 24-28.
- Walsh, C.M., Hardy, R.C., 1997. Factor structure stability of the California critical thinking disposition inventory across gender and various student majors. *Perceptual and Motor Skills* 85, 1211-1228.
- Walsh, C.M., Hardy, R.C., 1999. Dispositional differences related to gender and academic major. *Journal of Nursing Education* 38 (4), 149-155.
- Wangenstein, S., Johansson, I.S., Bjorkstrom, M.E., Nordstrom, G., 2010. Critical thinking dispositions among newly graduated nurses. *Journal of Advanced Nursing* 66 (10), 2170-2183.
- Watson, G.B., Glaser, E.M., 1980. *Watson-Glaser Critical Thinking Appraisal Manual: Forms A & B.* Psychological Corporation, San Antonio, Tx.
- Watson, G.B., Glaser, E.M., 1994. *Watson-Glaser Critical Thinking Appraisal Form-S.* Psychological Corporation, San Antonio, TX.
- Watson, G.B., Glaser, E.M., 2012. *Watson-Glaser Critical Thinking Appraisal User-Guide and Technical Manual.* Pearson Education, United Kingdom.
- Wheeler, L.A., Collins, S.K., 2003. The influence of concept mapping on critical thinking in baccalaureate nursing students. *Journal of Professional Nursing* 19 (6), 339-346.
- Yuan, H., Williams, B.A., Fan, L., 2008. A systematic review of selected evidence on developing nursing students' critical thinking through problem-based learning. *Nurse Education Today* 28 (6), 657-563.
