Table A: *Effectiveness of Educational Strategies for Clinical Reasoning in Nursing Education*

| Study and Country | Population and Setting | Educational Strategy | Methodology | Instruments and Outcome Measures | Results | Score |
| --- | --- | --- | --- | --- | --- | --- |
| Adema-Hannes and Parzen (2005)  Canada | 4 groups of third-year BScN nursing students *(n*=32) in a pediatric med-surgical clinical | Concept mapping | Pilot study  IV: Concept map  DV: Clinical reasoning | Simple short answer questions  Student self-report | Concept maps were “extremely useful in assessing the student’s knowledge, preparedness, and ability to make linkages between concepts” and 100% of students rated their Clinical Reasoning as improved | 2.44 |
| Bartlett et al. (2008)  USA | Undergraduate students (*n*=43) in a psychiatric-mental health nursing course | OPT worksheet  CR web | Quasi-experimental design with pretest and posttest  IV: OPT model  DV: Clinical reasoning | The OPT Model Rating Scale with NNN criteria to rate a pretest case study and posttest case study. | Significant difference between the pretest and posttest scores (*t*=-5.439, *df* =42, p<0.001) indicating that students’ ability to complete the model improved over time | 3.67 |
| Bland et al. (2009)  USA | Undergraduate students (*n*=43) in a psychiatric-mental health nursing course | Case study  OPT model  CR web | Quasi-experimental one-group pretest, posttest design.  IV: OPT model  DV: Clinical reasoning | Adapted textbook case study as the pretest and a case study developed by expert psychiatric nurse faculty in consultation with an OPT model expert as the posttest. | A significant difference was found between students’ ability to identify the correct keystone nursing diagnosis (p<0.05); 56% (n=23) identified the correct keystone issue at both pretest and posttest and 37% (*n*=16) showed improvement over the two-time points. | 3.67 |
| Brandao de Carvalho Lira and Venicios de Oliveria Lopes (2011)  Brazil | Undergraduate nursing students (*n*=30) in fifth semester at a Brazilian public university | Problem-based learning (PBL)  Case scenarios | Two-phase experimental study with control and intervention groups  IV: PBL  DV: Clinical reasoning and diagnostic trial | 1) Course effectiveness assessed through pre-test and posttest;  2) Analysis of differences in means between the number of defining characteristics, nursing diagnoses, and related factors students identified;  3) Analysis of differences in mean pretest and posttest scores inter and intra-experimental and control groups. | Statistically significant difference between the experimental group’s pre and post test scores; no difference in control group. Posttests, the experimental group’s mean scores were statistically higher than the control group (p<0.001). Experimental group identified a higher mean number of diagnoses (p=0.010) and related factors (p=0.000) on the posttest. | 3.78 |
| Burbach, Barnason, and Thompson (2015)  USA | Undergraduate BSN students (*n*=29) in a final semester of a college in the Midwestern United States | Think Aloud (TA) strategy, interview debriefing, and simulation | Mixed: Primarily qualitative with quantitative analysis of demographic data  Purpose: Describe how TA was used as a data collection strategy in a research study using HFPS. To provide examples of students’ vocalization patterns demonstrating clinical reasoning while using the method | Think Aloud approach to capture clinical reasoning during patient simulation.  Concurrent TA, verbalization of thoughts in short-term memory.  Retrospective TA, reflective thoughts verbalized during an immediate post-simulation interview | Quantitative: 86% of students demonstrated successful use of Concurrent TA, using Level 1, 2, or 3 verbalization patterns of CR while providing care.  TA provided rich source of data regarding clinical reasoning as experienced by the BSN student during high fidelity patient simulation. Concurrent and retrospective TA demonstrated effectiveness as teaching strategy to explore CR and three themes emerged 1) public and private voices, 2) the art of the pause, and 3) the narrator. | 3.33 |
| Chan et al. (2016)  Hong Kong | BSN students (n=122) enrolled in Nursing in Clinical Specialties course | Web-based Case-Based Learning (CBL) | Mixed methods  IV: CBL  DV: Perceived self-learning ability, clinical reasoning ability, and satisfaction in learning | Self-developed student learning questionnaire with psychometric testing demonstrating reliability.  Content analysis approach for qualitative data | No significant difference between the face-to-face and web-based approaches in terms of self-learning ability (*t*= - 0.067, p=.947), clinical reasoning ability (*t*= 0.358, p =.721), and satisfaction with the approach (*t*= -1.75, p=.083). Students expressed that CBL enhanced their critical thinking and problem solving abilities and they appreciated the CBL method. | 3.56 |
| Dawson et al. (2014)  USA | First-year BSN students (*n*=44) from state university in southeastern United States | Clinical scenarios with the script concordance test (SCT) | Comparative  IV: Expert panel and student SCT score  DV: Clinical reasoning | SCT student scores versus expert faculty panel. | A linear relationship between clinical experience and SCT scores was demonstrated. The mean scores of the students for the overall test (63.71, SD =8.5) were significantly lower than the expert panel mean scores (78.52, SD = 8.09). | 3.89 |
| Deschênes et al. (2011)  Canada | First year, BSN students (*n*=30) and 15 panel experts at University of Montreal | Clinical scenarios | Feasibility and acceptability study to develop a script concordance test (SCT) and conduct a preliminary validation of psychometric qualities.  IV: SCT  DV: Clinical reasoning | SCT scores for the experts and students | Statistically significant difference was found between the experts and novice. Student scores (53.3; SD =7.2) were significantly lower than expert scores (61.6; SD = 3.1) (p<0.01), suggesting a linear relationship exist between results in a SCT and clinical experience. | 3.78 |
| Dreifuerst (2012)  USA | Senior BSN students *(n*=238) at a university in Midwest | Debriefing for Meaningful Learning (DML) | Exploratory, quasi-experimental, pretest-posttest  IV: DML compared to customary debriefing strategies  DV: Development of clinical reasoning skills and student perception of quality of the debriefing experience | 1) HSRT to measure CR and clinical decision making  2) Debriefing Assessment for Simulation in Healthcare- Student Version (DASH-SV) to measure the extent the student perceived the debriefer  3) DML Supplemental Questions (DMLSQ) to measure the student’s perception of the use of DML | Statistically significant difference noted (U= 3973.5, W = 10759.5, Z = -6.059, p = 0.000) in the mean scores from pretest to posttest.  ANCOVA revealed significant between participants’ test effect of DML on total HSRT score, *F*(1, 237) = 28.55, p<0.05. Covariate was significantly related to the debriefing method, *F*(1, 237) = 623.91, p< 0.05. Implication: debriefing with the DML will generate a better overall student score on the CR posttest.  Z values for each of the mean scores from 6 elements measured by the DASH-SV and the 4 questions from the DMLSQ were significant p<0.05. Mean aggregate DASH-SV were significant (Z=-11.99, p<0.001).  All models were statistically significant except the DMLSQ item called Worksheet and DASH-SV element one. Data demonstrated greater changes in CR were associated with higher perceptions of quality debriefing. | 4.0 |
| Forneris et al. (2015)  USA | Baccalaureate senior nursing students (*n*=153) at four baccalaureate colleges in the Midwest | Debriefing for Meaningful Learning; Simulation | Quasi-experimental, pretest-posttest, repeated measure  IV: Structured debriefing using DML  DV: Clinical reasoning | Health Sciences Reasoning Test  DASH-SV | DML debriefing intervention group scored significantly higher in clinical reasoning than students who had normal debriefing (p=.023). Pretest scores intervention group (*n*=78, *M*=22.74, SD = 3.6) and control group (*n*=75, *M* = 22.06, SD = 3.7); Posttest scores after sim with DML, intervention group (*M* = 23.56, SD = 3.9) and control (*M* = 22.41, SD = 4.6). Quality of DML debriefing was evaluated with DASH-SV; intervention group scores (M=37.45, SD = 3.66) and control group scores (M=35.95, SD = 5.20) (p=.04), represented a positive difference in the quality of debriefing for the intervention group. | 3.78 |
| Forsberg et al. (2011)  Sweden | Nursing students (*n*=77) enrolled in 3 different distance-based learning courses at 2 different universities | Virtual patients (VP)-based exams | Feasibility study, 3 group comparison (Halmstad University 2 groups used the traditional Web-SP system, Karolinaska Institute group used the traditional Web-SP system with a new assessment module)  IV: VP new assessment module  DV: Student’s opinion about the feasibility of using VP for assessing clinical reasoning | Multiple Choice Question-based exam and 2 virtual patient cases requiring at least a 70% to pass.  Questionnaire to investigate nursing students’ opinions on the use of Virtual patients. | Mixed. Entire HH group and most of KI group (n=10) supplied the correct diagnoses and made adequate clinical decisions, but there was inconclusive data to explain student clinical reasoning.  KI group, (n=3) students failed. Student responses to VP-based exams was positive, finding the VP cases realistic and acceptable for nursing. | 3.44 |
| Georg and Zary (2014)  Sweden | Undergraduate nursing students (*n*=102) | virtual patient Nursing Design Model (vpNDM)  OPT Model as framework | Exploratory  Aims: 1) develop a theory-anchored model for developing VP, 2) investigate how VPs can be implemented as a learning activity, and 3) explore students’ perceived usefulness of VP | VP model used to assess knowledge levels and ability to reflect on aspects.  Online, self-report, 14-item questionnaire evaluated students’ experiences of learning with VPs and the development of CR skills. | VP could support nursing students’ development of CR skills. | 3.44 |
| Gonzol and Newby (2013)  USA | BSN students (*n*=30) in skills lab course | Identify, Relate, Understand, Explain, Predict, Influence, and Control (IRUEPIC) reasoning model | Quasi-experimental  IV: IRUEPIC model and Traditional nursing process based skills checklist  DV: Clinical reasoning in skills laboratory | Four specific rubric developed from the Intellectual Performance Rubric (IPR) | Statistically significantly higher aggregate intellectual performance scores with all components of the IRUEPIC model compared to control (Identify p < .085; Relate p < 0.41; Understand/Explain p < .004; Predict p < .005; Influence p < .031; and Control p <.012). Scores in psychomotor skills for control were 85.2% and experimental group were 84.7%. | 2.33 |
| Haffer and Raingruber (1998)  USA | Baccalaureate nursing students enrolled in clinical reasoning (CR) course (*n*=15) | Narrative case study, group dialogue, reflective logs | Interpretive phenomenology using narrative approach  Purpose: Discover students’ experiences of clinical reasoning and critical thinking development. | Thematic coding | Clinical reasoning is significantly impacted by self-doubts and diminished confidence. Six aspects were identified when shifting from confidence-diminishing to confidence-enhancing. | 3.33 |
| Harmon and Thompson (2015)  USA | Community college nursing students (*n*=17) in their 2nd med-surg clinical | Clinical placement; group collaboration for case study with OPT and CR web worksheets | Quasi-experimental, one-group time-series  IV: Collaborative activities  DV: Clinical reasoning skills | 1) Pretest: OPT model to measure clinical reasoning  2) OPT model rating tool | Statistically significant increase noted for the total score from pretest to posttest; Pretest scores were (*M*=48.80, SD = 13.94) and posttest (*M*=56.35, SD = 6.72) (*t* = 2.27, *df* = 14, p = 0.040). Individual domain increases were not statistically significant, given the sample size. Scores were relatively low compared to the total possible score (74.00). | 3.78 |
| Hicks Russell, Geist, and House Maffett (2013)  USA | Senior BSN students, sample size not provided | SAFETY template | Anecdotal description of SAFETY framework | Safety Grading Rubric | SAFETY is a useful tool for integration of content knowledge, clinical reasoning, and reflection on essential professional practice issues for BSN students. No statistical data presented. | 2.11 |
| Hoffman et al. (2011)  Australia | BSN students (n=320) | Interactive Computer Decision Support Framework (ICDSF) | Descriptive study of ICDSF Model that compared 2008 pilot sample to a 2009 student cohort. Purpose: describe the design and implementation of an ICDSF as a strategy to improve nursing students’ clinical reasoning skills. | Student survey | Overall students were highly satisfied with the clinical scenarios and believed they were an interesting and useful way to engage in authentic clinical learning and develop CR skills, problem-solving, and decision-making. | 2.55 |
| Hunter and Arthur (2016)  Australia | Clinical educators (*n*=10) in a BSN program at a large semi-metropolitan multi-campus university | Semi-structured interviews | Qualitative exploratory  Purpose: Gain an understanding of how clinical educators recognize, develop, and appraise nursing students’ clinical reasoning while on clinical placement. | Directed content analysis for categorization matrix and summative content analysis to count the number of educator responses with the sub-categories | Clinical educators did not consistently conceptualize, recognize, or facilitate the development of CR in students during clinical placement. Gap exists between theoretical teaching and the practical application. Clinical staff and the level of support impact the student’s ability to CR. Strategies identified and implemented by faculty included questioning, modelling, and the CR Cycle. Current clinical appraisal process did not capture CR ability or development and new evaluation tools are needed. | 3.44 |
| Jensen (2013) | ASN and BSN students (*n*=88) prior to graduation | CR Competency Evaluation (CRCE) simulation  course | Descriptive  Aims: 1) Evaluate nursing students’ clinical reasoning skills during simulations using the LCJR. 2) Compare students’ self-assessed and faculty assessed ratings of clinical reasoning skills | Lasaster Clinical Judgment Rubric | BSN students had significantly higher mean LCJR total scores than ASN students (BSN *M*=34.33, ASN *M*=30.90; *t(*84) = -2.65, p=0.010; Cohen’s d=0.65). | 3.33 |
| Jessee and Tanner (2016)  USA | Pre-licensure nursing students BSN students (n=80) and Accelerated BSN [MSN] (n=140) | Clinical Coaching | Descriptive Instrument Development  Purpose: Develop an instrument to describe and quantify the construct of clinical coaching used by a clinical supervisor with a student in patient care situations to promote student identification of salient aspects of nursing practice. | Clinical Coaching Interactions Inventory (CCII) | CCII is a 20-item instrument based on supervisor questioning, Tanner’s clinical judgment, Bloom’s taxonomy, and simulation evaluation tools. CCII examines student-supervisor interaction in the clinical setting among teaching-questioning and feedback. CCII may facilitate pre-licensure clinical coaching strategies to enhance students’ CR skills. | 2.78 |
| Johnsen et al. (2016)  Norway | BSN students *(n*=6) | Video-based serious game (SG) prototype | Pilot study  IV: SG prototype  DV: Clinical reasoning and decision-making skills | Cognitive walkthrough, questionnaire, and interviews | SG was perceived as realistic, clinically relevant, and easy to learn; however, usability issues were identified. No results given specifically on measurement of CR. | 2.0 |
| Johnsen et al. (2016)  Norway | BSN students (n=6) | Serious game | Mixed methods  Aim: Describe the design, development, and usability evaluation of a video based SG for teaching clinical reasoning and decision-making skills. | In-game and postgame assessment that included cognitive walkthrough evaluation, observations, a posttest usability questionnaire, and follow-up interview | Study demonstrates the uniqueness of SGs’ contribution to learning by providing realistic situations in clinical practice settings that enable active, experiential, situated, and problem-based learning. | 3.56 |
| Kautz et al. (2006)  USA | BSN students (*n*=10) in junior year medical-surgical course | OPT worksheet  CR web | Retrospective, descriptive analysis  Aim: Evaluate the use of OPT model as a structure or scaffold for application and learning about relationships between and among standardized nursing language terms as they support clinical reasoning. | NANDA International, Nursing Interventions Classification, and Nursing Outcomes Classification (NNN) Scoring Instrument | Mixed. Evaluated student’s ability to complete OPT. Findings: NNN language was not consistently used to complete the OPT worksheet; however, the OPT worksheet helped students identify the priority nursing diagnosis, associated interventions, and outcomes. | 3.33 |
| Kautz et al. (2005)  USA | Junior baccalaureate nursing students (*n=*23) enrolled in med-surg clinical in a historically black college and university. | The Outcome-Present State Test (OPT) worksheet, Clinical Reasoning (CR) web, and Self-regulated learning (SRL) journal | Quasi-experimental design with qualitative analysis of SRL  IV: SRL and OPT model  DV: Clinical reasoning skills | Faculty rated each component of the CR web and OPT model worksheet as “evident with a score of 1” or “not evident with score of 0.”  OPT model score data was analyzed using Cross-Tabs with a Chi test between weeks for each student.  Student journals were analyzed using a computer program for verbal protocol analysis (VPA) to evaluate the nature of thinking and reasoning based on word subjects used to document reflections. | Significant difference in students’ ability to frame the situation over time (Pearson Chi-Square 6.84, p=0.033); and in students’ ability to make decisions about appropriate interventions over time (Pearson Chi-Square 9.882, p=0.007). Researchers found 63-66% of the nouns used during reflection, ranked in descending order: 1) persons in the environment, 2) situations in clinical, 3) reactions during clinical, 4) knowledge, 5) thinking activities, & 6) environmental circumstances. Thinking or reasoning strategies were 52-54% behavioral, 31-34% metacognitive, and 13-16% environmental. | 4.0 |
| Khanyile and Mfidi (2005)  South Africa | BSN students (*n*=87) | Problem-Based Learning (PBL)  Traditional-Based Learning | Comparative Analysis using cross-sectional survey design  IV: PBL  DV: Clinical reasoning | Triple Jump Start Exercise  Think Aloud | Results revealed that neither approach used, nor the level of training had a significant effect on the student’s CR scores with p=0.21 for TDL and p=0.8 for PBL. | 3.44 |
| Kubin et al. (2013)  USA | Convenience sample, (*n*=208) third-semester undergraduate BSN students enrolled in a pediatric nursing course in southwestern university | 1)Traditional group: hospital-based in-patient clinical  2) Hybrid group: blend of hospital-based and alternative experiences both in and out of the hospital  3)Nontraditional group: majority of clinical learning out of the hospital  All groups had 90 clinical hours, interactive lab, teaching project, and simulation. | Quasi-experimental with posttest; 3-group comparison  IV: Clinical teaching schedules  DV: Student knowledge, clinical decision-making, and student satisfaction and perception of learning | Clinical Reasoning Tool to evaluate CR skills.  HESI standardization exam raw scores to record student knowledge  End-HESI examination Pediatric subscale scores  Average student course evaluation scores | No statistically significant difference among groups in either clinical reasoning or HESI knowledge scores was noted. CR scores ranged from 56 to 199, with the average CR scores as followed: traditional group (156.1), hybrid group (148.4) and nontraditional group (154.1).  HESI scores ranged from 554-1,226 with the average HESI scores as followed: traditional group (887.32), hybrid group (908.09) and nontraditional (884.86). Researchers found it was not possible to correlate the End-HESI Pediatric subscale scores directly to the study.  Course evaluations indicated students were overall positive about their clinical learning. Students in the nontraditional group expressed a desire for more inpatient clinical time. Traditional group felt the most comfortable with their assessment abilities and the nontraditional the least comfortable. | 3.78 |
| Kuiper et al. (2008)  USA | Undergraduate BSN students (n=44) | Simulation  Structured debriefing using OPT | Descriptive  Aim: 1) To determine clinical reasoning activities surrounding patient simulation and how they compare to authentic clinical experiences. 2) To determine if the OPT model could be used as a method of debriefing. | OPT model rating tool to compare OPT model worksheet from clinical experience (highest scored) to OPT model worksheet completed for high-fidelity simulation | No statistically significant difference between mean scores; simulation scores (*M*=48) and clinical experience (*M*=47) (t= -1.321, p=.194). Scores were relatively low compared to the total possible score (76). No significant difference when comparing scores for each section of the OPT between clinical experience and high fidelity simulation (t= -.680, p=.504). | 3.44 |
| Kuiper, Pesut, and Kautz (2009)  USA | BSN students (*n*=66) over 8-months | Self-Regulated Learning Model (SRL)  OPT model | Mixed  Aims: 1) To evaluate the OPT Model of Clinical Reasoning and the nursing language content over two academic semesters. 2) Evaluate the reflective journals based on the SRL model to expose metacognitive awareness and thinking strategies. | 1. OPT model worksheet 2. Clinical reasoning survey 3. Retrospective review of OPT model worksheets to determine measurement of CR content through use of standardized nursing language 4. Retrospective verbal protocol analysis (RVPA) | Results from the OPT rating scale showed significant correlations between the sub-groups of students and the ability to frame situations over time (Pearson’s Chi-Square 6.84, p=0.033) and in the ability to make decisions about appropriate interventions over time (Pearson’s Chi-Square 9.882, p=0.007).  Data from CR self-report student survey revealed OPT model strengthened my thinking skills (Z -2.032, p=.042); made a difference in how I think about patient care problems (Z -2.922, p=.003); and I seek new ways to think about complex problems (Z -2.30, p=.021).  Results showed students stated the priority keystone problem in the appropriate NANDA-I format 92% of the time.  RVPA results showed most reflections were related to thinking strategies, environmental situations, and self-monitoring. There were more cause and effect relationships identified in sample of students who used the OPT worksheet (t=2.650, df 22, p=.01). | 3.89 |
| Lapkin and Levett-Jones, (2011)  Australia | Second-year (*n*=268) and third-year BSN students (*n*=84). Subset data (*n*=38) were used in CR component of study | Simulation  Think Aloud approach | Cost-utility analysis using data from a previous quasi-experimental  IV: Medium-vs. high fidelity sim manikins  DV: Clinical reasoning, knowledge acquisition and student satiisfaction | Direct observation with checklist where students scored 1 point for every item completed on the checklist (highest possible score of 94)  Knowledge acquisition was measured with TestGen Pretest with Post-test at 2 weeks  Simulation Experience Scale (SSE) | Statistically significant difference, the experimental group (high fidelity) TA checklist scores (42.9, SD=15.78) were higher than control group TA checklist scores (19.22, SD=11.09).  No statistical difference in mean test scores from Test 1 to Test 2 for either group.  No statistical difference in satisfaction between the two groups. | 4.0 |
| Le Roux and Khanyile (2012)  South Africa | BSN students (n=233) enrolled at University, first year (*n*=90), second year (*n*=92), third year (*n*=21), and fourth year (*n*=20) | Case-based clinical reasoning approach | Quantitative  IV: Case-based clinical reasoning approach  DV: Self-reported competency of clinical reasoning | Descriptive cross-sectional survey to determine self-reported competency | Used self-report; findings were inconclusive. Feelings of competence did not increase as the student progressed to higher year levels. First year students’ feelings of competence increased due to the use of case-based clinical reasoning approach. | 3.11 |
| Lee et al. (2016)  Korea | Senior nursing students (*n*=49), in which (*n*=26) were enrolled in a clinical reasoning course | Simulation  CR Course | Quasi-experimental study of non-equivalent control group pretest-posttest design  IV: High-fidelity patient simulation led clinical reasoning course  DV: Self-report nursing core competencies, problem solving, academic self-efficacy, and Kolb learning style inventory | Nursing core competency measurement tool  Problem-solving skills tool  Academic self-efficacy tool | Experimental group scored higher on nursing core competencies (256.47 + 32.33; *F* = 7.747, p = 0.008) compared to the control group.  No statistically significant difference between the groups for problem-solving or academic self-efficacy. | 3.78 |
| Levett-Jones et al. (2011)  Australia | second-year (*n*=268) and third-year (*n*=76) BSN nursing students from Australian university | Simulation | Mixed methods: Exploratory factor analysis and thematic content analysis of qualitative data from the open-ended questions on the SSE scale | Satisfaction with Simulation Experience Scale | No statistically significant difference in SSE scores. Second-year high fidelity group had higher SSE scores than the second-year medium fidelity group; however, the difference was not statistically significant (t = -1.586, p>0.05). No statically significant difference in the third-year groups (t = -0.586, p>0.05). Participants commented that simulation allowed them to apply what they learned about CR and they could describe how the sim “reinforced the importance of accurate and timely patient assessment, careful interpretation of cues, and inter-professional communication,” but none believed it should replace clinical hours. | 4.0 |
| Murphy (2004)  USA | Community nursing students (*n*=33) in first semester | Focused reflection and articulation via journal writing and post conferences | Mixed: Experimental design with qualitative data  IV: Focused reflection and articulation  DV: Clinical reasoning | Assessment and Analysis Instrument (AAI), Unit exams, and Reflection and Articulation Inventory (RAI). | Mixed. No significant difference between groups on the CR composite scores; however, there was a significant difference between the two groups on practice measure of CR (d=1.22, t=3.33. p<.01). | 3.11 |
| Russell et al. (2011)  USA | Accelerated BSN students (*n*=73) | Clickers  Case study | Descriptive Quantitative Survey  IV: Clicker technology  DV: Clinical reasoning and problem solving | Student survey | Clickers made class more engaging (95% agreed or strongly agreed), helped students pay attention (76% agreed or strongly agreed), allowed students to participate more openly (75% agreed or strongly agreed), and helped hone critical thinking skills (76% agreed or strongly agreed). | 2.67 |
| Stec (2016)  USA | BSN senior nursing students (n=7) | Newman’s theory of health as expanding consciousness | Qualitative Research as praxis methodology  Purpose: Explore the meaning of clinical reasoning in pre-licensure BSN students. | Data analysis of participant transcripts  Data of what has meaning for the participants in the CR process and how the participants share the process of CR was reviewed emergence of consistent patterns | CR is an evolving pattern and a maturing process over time. Study participants gained insight and expanded consciousness through multiple clinical experiences and interactions with members of the interdisciplinary team. | 3.44 |
| Tesoro (2012)  USA | Junior-year baccalaureate nursing students (*n*=99) in two BSN programs in New York Metropolitan area | Developing Nurses’ Thinking (DNT) model; case study; post-conference | Quasi-experimental with control and intervention groups, pretest and posttest  IV: DNT model  DV: Accuracy of nursing diagnoses | 1) Case studies to measure students’ diagnostic accuracy.  2) Lunney scoring tool to measure judgments of nursing diagnostic accuracy on a continuum form high-to-low.  3) Post conference reflection to gain an understanding of the students’ experiences of the post conference and their preferred teaching and learning formats. | Frequencies of students’ accuracy scores from pretest were similar the control (41%) and the intervention group (48%) for scoring +3 or higher (X2 [11] = 9.77, p=0.552). Posttest scores from intervention group showed statistically significant improvement in accuracy, (49%) of the control group achieved scores +3 or higher with (5%) achieving the highest score and (74%) of the intervention group achieved scores +3 or higher with (28%) achieving the highest score (X2 [11] = 21.09, p =0.032).  Posttest, independent samples t test, the mean score on accuracy of nursing diagnosis was statistically significantly lower for the control (*M*=2.68) compared with the intervention (*M*=3.58) (*t* [81]= -2,78, p=0.007).  No significant improvements in accuracy scores were noted in the control group (*M*=0.12, SD = 1.85, p =0.691), however, significant improvements were noted in the intervention group *(M*=0.99, SD=1.89, p=0.001). | 3.78 |
| Trevisani et al. (2016)  Brazil | BSN students (n=20) | Concept Mapping | Descriptive Qualitative  Purpose: Identify whether the use of concept mapping strategy assists a student to extend and revise their expertise in oncology and analyze if CM strategy encourages the development of skills to guide decision-making | Semi-structured questions  Content analysis of description of a critical incident | Concept mapping helped students to revise and expand knowledge in oncology and develop fundamental skills for practice, including the multilinear reasoning for understanding the clinical situation and the importance of comprehensive care. | 3.44 |