NCSBN
Leading in Nursing Regulation

National Council of State Boards of Nursing, Inc.
111 E. Wacker Drive, Suite 2900
Chicago, IL 60601-4277
312.525.3600
312.279.1032 fax
www.ncsbn.org

**National Council of State Boards of Nursing**

# Systematic Review of Studies of Nursing Education Outcomes: An Evolving Review

**Nancy Spector, PhD, RN, Director of Education**

**April 2006**

The systematic review is an integral part of evidence-based health care. One of the best definitions of evidence-based medicine (which can be applied to health care in general) is "…the integration of best research evidence with clinical expertise and patient values" (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000, p. 1). This is a comprehensive definition that doesn't just include the results of the best studies, but it also considers clinical expertise and the patients' needs. When applying evidence-based health care to nursing education, we should employ the best studies available, integrated with the expertise of qualified and experienced nursing faculty and the values and needs of our students.

A systematic review is the overview of several randomized trials of the same intervention or treatment for the same situation or condition; this overview systematically and critically reviews and combines all the studies, providing a better answer than the results from just one study (Sackett et al., 2000). Since there are not a lot of randomized trials available on nursing education, this systematic review is intended to be a critical analysis of evidence supporting, or not supporting, nursing education strategies and learning environments. It is important to note that this is an evolving review that will continually change as more research becomes available.

Systematic reviews consider the strength of the evidence for a particular strategy. Therefore, in this review the levels of evidence, or hierarchies of the studies, are identified. There are several ways that researchers classify research studies. One system is to grade the studies on a rating of I to V. Level I studies are large randomized control trials (RCTs); level II studies are RCTs with 50 subjects or fewer; level III are smaller cohort or case-control and cohort studies; level IV evidence come from case reports and low-level case-control and cohort studies; finally, level V is expert or consensus based on experience, physiology or biological principles. Another system uses the levels A through D to designate the strength of the evidence. Grade A is the strongest evidence, while grade D is the weakest (Mayer, 2004).

Many systematic reviews only use randomized controlled trials; however, that would limit the results in this review. Therefore, in this review, the level of evidence will be rated as adapted from Gallagher (2003) and Polit & Beck (2004). Gallagher (2003), while writing a clinical article, used a meaningful, easily understood method of rating studies. To avoid confusion, Polit and Beck's description of Level II nonexperimental studies was used to be more in line with nursing studies.

It is important for nurses to strongly consider the level of evidence when making decisions to use research in their practice. Level II or III evidence should not be discounted. If those studies are done well, they can begin to identify relationships, obtain information about populations and help us to understand the viewpoints and realities of those under study (Polit & Beck, 2004). Further studies can corroborate these findings or study the variables in a more controlled design. For the purposes of this review, the levels of the studies will be identified as:

- **Level I.** A properly conducted randomized controlled trial, systematic review or meta- analysis.

- **Level II.** Other studies, such as *quasi-experimental***,** correlational, descriptive, survey, evaluation, and qualitative.
- **Level III.** Expert opinions or consensus statements

The databases used to retrieve these studies were CINAHL, Medline and ERIC. Keywords used were: education, nursing, teaching, education research, learning methods, learning strategies, research-based education, and outcomes of education. The Reference Librarian at Rush Medical Center School of Nursing assisted in identifying appropriate articles. All issues not available at the Rush University School of Nursing were ordered.

The following criteria were used to select the studies:

- Study of educational outcomes.
- Identification of a design.
- Sample description.
- Comparison being studied or objective of the study (for noncomparison studies).
- Reporting of results.
- English-only studies (including countries outside the United States).

## References

Gallagher, R. (2003). An approach to dsypnea in advanced disease. *Canadian Family Physician*, *49*, 1611-1616.

Mayer, D. (2004). Essential evidence-based medicine. Cambridge: University Press.

Polit, D.F. & Beck, C.T. (2004). *Nursing research: Principles and methods*. Philadelphia: Lippincott Williams & Wilkins.

Sackett, D. L., Strauss, S.E., Richardson, W.S., Rosenberg, W., & Haynes, R.B. (2000). *Evidence-based medicine*. London: Churchill Livingstone.

| Article | Sample | Comparison Studied | Study Procedures | Key Results | Strengths & Weaknesses | Implications for Boards |
|---|---|---|---|---|---|---|
| Angel, B.F., Duffy, 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.<br>***Level II*** | N = 142 undergraduate junior nursing students, during the Fall of 1996.<br>93% female<br>86% white<br>Average age 24 ±5.5 | Structured format for Health Pattern Assessment versus unstructured format. | Outcomes were acquisition of knowledge and development of critical thinking skills.<br>Longitudinal, quasi-experimental study, utilizing a pre-/post-test design.<br>A Case Study Questionnaire was developed to measure knowledge and to elicit characteristics of critical thinking. | ■ Learning characteristics (e.g., age or previous degree) affected which teaching strategy was effective.<br>■ Older students and those without a previous degree tended to benefit more from the unstructured approach; younger students tended to benefit more from a structured approach.<br>■ Knowledge and critical thinking improved after a semester of faculty supervised clinical experiences. | ■ One of very few studies that measured critical thinking during clinical experiences.<br>■ Psychometrics of the measurement tools needed to be cited.<br>■ Students assigned to groups by a stratified random procedure. | ■ Evidence supporting that supervised clinical experiences with qualified faculty can improve the critical thinking of students.<br>■ Teaching strategies may be affected by student characteristics. |
| Armstrong, S., & Muller, M. (2002). A value clarification on quality within nursing colleges in Gauteng. *Curationis*, February, 52-68.<br>***Level II*** | Stratified sampling was used to obtain student and employer samples.<br>Lecturers were selected by purposive sampling.<br>Funders were selected by purposive sampling. | They developed a quality audit system and conducted a study to describe a value clarification on quality within the Nursing Colleges in Gauteng. | Data collection included interviews, naïve sketches and document analysis.<br>Data analysis was done using a modification of Tesch's content analysis procedure.<br>Guba's model of trustworthiness was used to ensure truth-value, applicability, consistency and neutrality. | Three themes were identified:<br>■ Structure – human resources, technology, theoretical learning facilities, practical learning facilities and strategy.<br>■ Process – leadership, educational program, relationship and research.<br>■ Results/Outcomes – community outreach, products of the college, organizational development and recognition. | ■ Methodology to ensure reliability of the data was strong.<br>■ Data were collected from multiple sources.<br>■ Data collection might have been more consistent across all subjects.<br>■ Tape recordings might have been used on all subjects. | This study was able to validate that structure, process, and results/outcomes are important areas to evaluate for board approval surveys. |
| Babenko-Mould, Y., Andrusyszyn, M., & Goldenberg, D. (2004). Effects of computer-based clinical conferencing on nursing students' self-efficacy, *Journal of Nursing Education*, *43*(4), 149-155.<br>***Level II*** | Convenience sample = 42 fourth-year nursing students at an Ontario University.<br>Control group = 27<br>Online intervention group = 15.<br>95% female; average age of 24 ± 5. | Examination of the differences in fourth-year baccalaureate nursing students' self-efficacy (or confidence) in carrying out nursing competencies, when using the addition of computer conference discussions, versus using only traditional conference discussions.<br>Examination of strengths and challenges of computer-mediated learning (CML). | Design — Pre-/post-test, quasi-experimental, nonequivalent group.<br>Theoretical framework — Bandura's theory of self-efficacy.<br>Descriptive analysis was also used to explore themes regarding strengths and challenges of online learning. | ■ Self-efficacy for students in the intervention group was not found to be significantly different from that of students in the control group.<br>■ In both groups, students' Self-Efficacy for Professional Nursing Competences Instrument (SEPNCI) scores increased from pretest to posttest.<br>■ All students agreed (some strongly) that computer conferencing enhanced learning.<br>■ Four strengths associated with computer conferencing were connection, support, learning and sharing.<br>■ Two challenges of CML were time and Internet access. | ■ Content validity only was established.<br>■ Cronbach's alpha reliability coefficients were calculated for both instruments and were acceptable.<br>■ While online evaluations were rated positively by the students, there were no differences between the groups (traditional and traditional with CML) regarding self efficacy for nursing competencies; the study, therefore, really cannot conclude that CML can contribute to increased confidence levels, though authors conclude this. | ■ This supports the idea that clinical practicum experiences, with qualified faculty, increases nursing students' level of confidence in all nursing competence domains.<br>■ Online learning need not be geographically oriented.<br>■ Online learning can be a positive experience for nursing students, though further testing must be done to determine if it is as effective as traditional methods. |
| Benner, P. (2004). Using the Dreyfus Model of skill acquisition to | Three studies:<br>■ 1978–1981 — 21 paired new | ■ 1978–1981 — Delineate and describe characteristics of | Qualitative design (narratives, interviews & observations) | ■ Demonstrated that the Dreyfus Model is useful for understanding learning needs of students and | This study is a 21-year review of Dr. Benner's studies on the Dreyfus Model. Because of that, the methodologies | ■ Students learn best when qualified faculty provides coaching, feedback and |

| Article | Sample | Comparison Studied | Study Procedures | Key Results | Strengths & Weaknesses | Implications for Boards |
|---|---|---|---|---|---|---|
| describe and interpret skill acquisition and clinical judgment in nursing practice and education. *Bulletin of Science, Technology & Society*, *24*(3), 188-199.<br>***Level II*** | graduates & their preceptors; 51 experienced nurse clinicians; 11 new graduates; 5 senior nursing students<br>■ 1988–1994 — 130 practicing ICU and general unit nurses<br>■ 1996–1997 — 75 critical care nurses | nurse performance at different levels of education and experience.<br>■ 1988–1994 — (1) describe nature of skill acquisition in critical-care nursing practice (2) delineate the practical knowledge embedded in expert practice.<br>■ 1996–1997 — Extension of above study, with inclusion of other critical-care areas. | ■ 1978–1981 — interviews with paired samples; interviews and/or participant observations with the rest of the sample.<br>■ 1988–1994, 1996–1997 — Small group narrative interviews, individual interviews, and participant observation. | nurses.<br>■ Novice or first year of education — operates from the perspective of inflexible, rule-governed behavior.<br>■ Advanced Beginner or new graduate — heightened awareness of feedback and frequently experience anxiety and fatigue.<br>■ Competent or one to two years in practice — decides what is important based on past experiences.<br>■ Proficiency or transitional stage to Expert — develop the ability to let the situation guide the nurses' responses.<br>■ Expert or phronesis (practical wisdom) — the integrated rapid response is the hallmark of expertise. | weren't described in much detail, and establishing reliability and validity in this qualitative study weren't addressed. These may have been addressed in the prior published studies. | reflection throughout nursing education.<br>■ During the Novice stage, learning is best fostered by providing safe, clear directions first with simulations, followed by situated learning experiences. |
| Bjørk, I.T. & Kirkevold, M. (1999). Issues in nurses' practical skill development in the clinical setting. *Journal of Nursing Care Quality*, *14*(1), 72-84.<br>***Level II*** | Four nurses employed in different surgical units of two Norwegian Hospitals. | Development of practical skills of postoperative ambulation and dressing wounds. | ■ Longitudinal qualitative study.<br>■ Videotaped the nurses during the skill performance and interviewed nurses and patients afterwards; observations done three times with three to five month intervals.<br>■ Videotaped actions were described impressionistically and coded. | ■ Many omissions and faults with their performances were seen even on the third videotape, after eight to 14 months experience and 25 experiences with skills.<br>■ The nurses associated learning with efficiency and motor aspects of performance.<br>■ The nurses did not have much guided experience, and the units did not encourage collaboration. | ■ Patient conditions could vary from one videotape to the next; thus, affecting the complexity of the skill performance.<br>■ The authors didn't address inter-rater reliability or their coding system.<br>■ The selection of the nurses wasn't discussed. | ■ The general assumption that experience leads to mastery was challenged by this study.<br>■ Active reflection of one's own experience is a premise for experiential learning. If reflection is not fostered, improvement will not occur.<br>■ Similarly, guided experience or feedback from qualified practitioners is essential for improvement. |
| Buckley, K. M. (2003). Evaluation of classroom-based, Web-enhanced, and Web-based distance learning nutrition courses for undergraduate nursing. *Journal of Nursing Education*, *42*(8), 367-370.<br>***Level II*** | ■ Convenience sample of 58 students enrolled in three consecutive nutrition and health courses.<br>■ N=24 in traditional lecture format; N=23 in Web-enhanced format; and N=11 in Web-based format.<br>■ Traditional four-year baccalaureate | ■ Investigated differences between the same course content being delivered by traditional, Web enhanced, and Web-based formats.<br>■ Investigated differences regarding student perceptions of experiencing content via these three different formats. | ■ A descriptive comparative study method was used.<br>■ Outcomes measured were exam scores, overall course grades and standard course evaluations. | ■ Students' qualitative comments revealed both positive and negative aspects of online instruction.<br>■ No differences were found in student learning outcomes.<br>■ Web-enhanced courses were most popular.<br>■ Comments showed that possible sources of student satisfaction are student profiles, learner characteristics, student motivation and the communication process. | ■ While instructors weren't blinded to the format, all exams were multiple choice which limited the bias.<br>■ Groups were not equal in size.<br>■ Students had no choice in the instructional format, though assignment to groups was not specified.<br>■ Because of small number of cases in each group, it would take a large effect size to find significant differences.<br>■ Administration of the computer exams and the paper and pencil exams was starkly different. | ■ Students' needs for structure, instructor interaction and a feeling of belonging must be addressed in the development of distance learning courses.<br>■ Information concerning students' preferred learning styles and motivations for learning should be solicited before selecting the form and extent of technology used in a course. |

| Article | Sample | Comparison Studied | Study Procedures | Key Results | Strengths & Weaknesses | Implications for Boards |
|---|---|---|---|---|---|---|
| | degree program, second-degree students, and RN BSN students. | | | | ■ Authors attested to adequate reliability and validity of the course evaluation tool, though no statistics were provided; exam psychometrics weren't cited. | ■ Online nursing courses can be just as effective as traditional lecture courses. |
| Epstein, R. M. & Hundert, E. M. (2002). Defining and assessing professional competence. *JAMA*, *287*(2), 226-235.<br>***Level I*** | 195 relevant citations. | ■ Propose a definition of professional competence.<br>■ Review current means for assessing it and to suggest new approaches of assessment. | ■ Used the MEDLINE database from 1966 to 2001 and referenced lists of relevant articles for English-language studies.<br>■ Excluded articles that are purely descriptive, duplicate reports, reviews, and opinions and position statements. | ■ Definition of "professional competence:" ***the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values and reflection in daily practice for the benefit of the individual and community being served***.<br>■ Common methods: subjective assessment by supervisors, multiple-choice exams evaluating factual knowledge and abstract problem solving, and standardized patient assessments of physical exams and technical communication skills.<br>■ Few assessments use participatory decision-making measures; few reliably assess clinical reasoning, systems-based care, technology and the patient-doctor relationship; and few incorporate the perspectives of peers and patients. | ■ Data retrieval was done by one researcher.<br>■ Use of MEDLINE only negates use of unpublished studies and dissertations and studies in other professional disciplines.<br>■ Criteria for selecting the studies allowed for a variety of types of studies to be included.<br>■ Can it be generalized to nursing?<br>■ Future directions in comprehensive assessments were provided. | ■ Might provide good grounding for continued competence study.<br>■ Provides the boards with information about comprehensively assessing professional competence in health care workers. |
| Girot, E.A. (1995). Preparing the practitioner for advanced academic study: The development of critical thinking. *Journal of Advanced Nursing*, *21*,387-394.<br>***Level II*** | ■ Convenience sample.<br>■ Setting: England.<br>■ 25 undergraduate nursing students in the control group; 15 in intervention group. | Compared the students' perceptions of their critical thinking development in a traditional university setting and in a short course setting. | ■ Comparative quantitative study with a qualitative component.<br>■ Semistructured questionnaires. | ■ Nonuniversity students defined "critical thinking" as the ability to analyze the written text, whereas the university students viewed it as having a direct relationship with their own practice.<br>■ The university-educated students reported that they were more confident in their critical thinking skills, questioned their practice more; receptive to new ideas, express themselves better, and were more flexible and less ritualistic in practice. | ■ Psychometrics on questionnaires not supplied.<br>■ Essence of questionnaires needed to be shared.<br>■ Self-reports can be biased, and need to have corroborating evidence. | ■ Beginning evidence that developing critical thinking skills requires time and exposure to others who are seeking similar goals.<br>■ Critical thinking should be integrated throughout the educational process, rather than to be taught in one short course, and should be taught collaboratively with education and service. |

| Article | Sample | Comparison Studied | Study Procedures | Key Results | Strengths & Weaknesses | Implications for Boards |
|---|---|---|---|---|---|---|
| Greenhalgh, T. (2001). Computer assisted learning in undergraduate medical education. [Electronic Version]. *British Medical Journal*, 322(7277), 40-44.<br>***Level I*** | 12 prospective randomized studies of medical students with objective, predefined outcome criteria. | Outcomes of learning with computer assistance. | ■ Systematic review of published studies, with 200 potentially relevant studies.<br>■ All 12 had comparison groups. | ■ A failure of student engagement can occur because of online glitches and "dead" hypertext links.<br>■ Evaluation of unsupervised students attempting to gain access from remote sites should include observation.<br>■ Adequately train these teachers, and they should be the senior teachers.<br>■ Barrier to computer-assisted learning is poor integration with other forms of learning.<br>■ Sharing of templates within, and even outside of universities, should be considered. | ■ Many of the studies had methodological problems, lacked statistical power, had possible contamination between the intervention and control groups, and had sample attrition<br>■ Systematic review rigorously reviewed 12 randomized controlled trials, using a standard retrieval method and objective selective criteria.<br>■ Can it be generalized to nursing students? | ■ When evaluating computer-assisted learning, the schools of nursing should observe unsupervised students from remote sites.<br>■ Aim to use a variety of teaching strategies, including traditional methods, along with computer assisted learning products. |
| Ironside, P. M. (2003). New pedagogies for teaching thinking: The lived experiences of students and teachers enacting narrative pedagogy. *Journal of Nursing Education*, *42*(11), 509-516.<br>***Level II*** | ■ 18 students and 15 teachers were interviewed, to date.<br>■ Includes teachers and students from all levels and types of nursing schools. | Explored how teachers and students experience enacting a new pedagogy, Narrative Pedagogy, and this article explains how enacting this pedagogy offers new possibilities for teaching and learning thinking. | ■ Audio-taped, unstructured interviews face-to-face or by telephone.<br>■ Participants were asked to "tell about a time that stands out for you because it shows what it meant to you to teach a class using Narrative Pedagogy."<br>■ Further probing: "What did that mean to you?" or "Can you give an example?"<br>■ Questions were intended to keep participants engaged in their stories without directing them to particular aspects or events.<br>■ Verbatim transcriptions.<br>■ Data analyzed using Heideggerian hermeneutical phenomenology. | ***Themes***<br>***Thinking as Questioning: Preserving Perspectival Openness.***<br>***Practicing Thinking: Preserving Fallibility and Uncertainty.***<br>■ These themes describe how the teachers and students experienced thinking in the context of Narrative Pedagogy and how Narrative Pedagogy influenced their thinking.<br>■ Thinking as questioning involved persistently questioning the meanings and significance of learning experiences and making visible that which had "not been thought of before."<br>■ The shift is to bring complexity and uncertainty into the classrooms and clinical situations, inviting students to think about nursing practice.<br>■ The emphasis shifts from the student acquiring the teacher's perspective to the student exploring multiple perspectives. | ■ Vague, unclear or conflicting interpretations arising during analysis were clarified by referring back to the interview texts.<br>■ The research team analyzed the texts and the interpretations for coherence, comprehensiveness and thoroughness. | ■ In outcomes education students are taught that they are safe if they know what the teacher told them to know; with this pedagogy thinking is necessary for knowledge and theory application.<br>■ In the future being safe in practice might require nurses to think in ways that persistently question practice.<br>■ With this pedagogy to keep students and patients safe in nursing practice, teachers ask the necessary questions, and content and knowledge is extended and enhanced.<br>■ Research shows that nursing faculty often tell students there is "no one right answer" and that it "all depends," although their pedagogical practices often reflect and reinforce the opposite.<br>■ In this pedagogy clear and concise test items are constructed that focus on analytical thinking. |
| Issenberg, S.B., McGaghie, W. C., Petrusa, E. R., | Initial pool of 670 studies, reduced to 109. | Reviewed and synthesized existing evidence in | ■ Databases included ERIC, MEDLINE, PsychINFO, Web of | Medical simulations facilitate learning under the right conditions by: | ■ Rigorous systematic review with an eight-step pilot project; methodological | Simulations are valuable learning experiences when |

| Article | Sample | Comparison Studied | Study Procedures | Key Results | Strengths & Weaknesses | Implications for Boards |
|---|---|---|---|---|---|---|
| Gordon, D. L., & Scalese, R. J. (2005). Features and uses of high-fidelity medical simulations that lead to effective learning: A BEME systematic review. *Medical Teacher, 27*, 10-28.<br>***Level I*** | | educational science to answer what features and uses of high-fidelity medical simulations lead to the most effective learning. | Science and Timelit<br>■ 91 search terms and concepts in their Boolean combinations.<br>■ Hand searching<br>■ Internet searching<br>■ Attention to "gray" literature<br>■ Use of stringent criteria for inclusion of studies.<br>■ Qualitative data synthesis and tabular presentation of methods and outcomes. | ■ Providing feedback<br>■ Repetitive practice<br>■ Curriculum integration<br>■ Range of difficulty<br>■ Multiple learning strategies<br>■ Capture clinical variation<br>■ Controlled environment<br>■ Individualized learning<br>■ Defined outcomes<br>■ Simulator validity and effective learning correlate | issues were attended to; then the six-step study phase was undertaken.<br>■ All coding decisions were unanimous, and each rater was blind to the coding decisions of his/her partner.<br>■ Much variation in the strength of the findings in the peer-reviewed publications.<br>■ Limits on the published body of evidence ruled out formal meta-analysis. | carried out under the right conditions. |
| Joubert, A., Viljoen, M. J., Venter, J. A., & Bester, C. J. (2002). Evaluation of the effect of a computer-based teaching programme (CBTP) on knowledge, problem-solving and learning approach. *Health Sa Gesondheid*, *7*(4), 80-97.<br>***Level II*** | Convenience sample of 120 generic nursing students in two educational institutions in South Africa. | Evaluated the effect of the computer-based teaching program on knowledge, problem-solving skills and learning approach in relation to oncology content. | ■ A quasi-experimental design, using a pretest/post-test control group<br>■ Research was conducted in a nursing practice setting (control) and under strictly controlled circumstances in a multimedia computer center and in a practice and multimedia center (experimental groups).<br>■ They used six instruments; the reliability and validity of each were addressed. | ■ Computer teaching made no difference in respondents' knowledge of problem solving.<br>■ Computer teaching had a better effect in controlled circumstances.<br>■ The students were weak at identifying potential problems, and the computer-based teaching did not promote this ability.<br>■ Recommended that computer-based teaching not be used in isolation. | ■ Report was disorganized and hard to read.<br>■ Reliability and validity done on the instruments was relatively weak.<br>■ Some results weren't included because partner data was incomplete.<br>■ There were basic differences in the time spent using computer-based teaching between the intervention groups and the control group.<br>■ Unclear how assignment to groups was made.<br>■ Sample size was calculated using multiple factors.<br>■ Assessments were comprehensive. | ■ When used appropriately, computer-based teaching can increase knowledge.<br>■ Computer-based teaching should not be used alone, but it should be used with actual clinical experiences. |
| Kyrkjebø, J. M., & Hanestad, B.R. (2003). Personal improvement project in nursing education: learning methods and tools for continuous quality improvement in nursing practice. [Electronic Version]. *Journal of Advanced Nursing*, *41*(1), 88-98.<br>***Level II*** | 44 first-year nursing students, sample selection methodology was not documented. | Objective was to describe the use of a personal improvement project for teaching nursing students about continuous quality improvement. | Students participated in a two-hour session introducing them to the personal improvement project. They then participated in counseling sessions in week three and seven, which lasted for one hour. At eight weeks the students gave a 10-minute presentation of their projects. Data were collected using a questionnaire. | ■ Personal improvement project seems to be an effective way of introducing continuous quality improvement knowledge to nursing students.<br>■ Even those who did not succeed in achieving a personal improvement felt they had a positive learning outcome.<br>■ Teachers' involvement in the program is important. | ■ Self-reports can be biased.<br>■ Important to develop instruments that can measure change in knowledge.<br>■ Excellent review and integration of the literature.<br>■ No reports of psychometrics on their questionnaire. | Possible method of teaching continuous quality improvement. |
| Maag, M. (2004). The effectiveness of an interactive multimedia learning tool on nursing students' math knowledge and self- | A convenience sample of ninety-six undergraduate nursing students, attending two west coast | Nursing students were randomly assigned to one of four treatment groups, all with computer-based learning methods: | Described as experimental multifactorial study, though the sample wasn't randomly selected. Instruments: three investigator | ■ Interactive media presentation of remedial math and calculation concepts did not render statistically significant increases in mean math-test scores or math efficacy | ■ Further research is needed to determine if increased learning can be achieved by providing multimodal online learning modules that nursing students can use at their convenience for longer | ■ No significant differences were shown, either with math scores, math efficacy, or satisfaction with the teaching strategy, |

| Article | Sample | Comparison Studied | Study Procedures | Key Results | Strengths & Weaknesses | Implications for Boards |
|---|---|---|---|---|---|---|
| efficacy. *CIN: Computers, Informatics, Nursing, 22*(1), 26-33.<br>***Level II*** | universities participated in the study. The students were mixed gender, ethnically diverse and their ages ranged from 19 to 42 years. | text only, text and image, multimedia and interactive multimedia. | designed criterion-based tests involving basic math problems and drug calculations; the Mathematical Self Efficacy Scale (MSES); Student Satisfaction Survey, which was investigator designed. The scales were given at intervals, as described. The results were analyzed with descriptive statistics, one-way analysis of covariance and one-way analysis of variance. | at the post treatment and follow-up treatment periods.<br>■ Results indicated that a one-hour intervention is not sufficient to correct the deep-seated math problem that has been documented by educators for many years.<br>■ The study showed that the computer-based learning modules did not impede the students' learning.<br>■ Interactive multimedia group students were more satisfied with this method of learning, though this difference was not significant. | periods of time.<br>■ The investigators acknowledge that their results are limited because of the short treatment time, a lack of strong student motivation, and the use of a small convenience sample.<br>■ Reliability and validity was established on all the instruments they used.<br>■ It would have been instructive were they to have had a fifth comparison group with face-face learning.<br>■ Extraneous variables, such as motivation, test anxiety, and computer attitudes might be the focus in future studies. | with four different computer-based methods of instruction.<br>■ While there was no comparison with face-to-face learning, these methods should continue to be explored as useful adjunctive teaching methodologies. |
| MacIntosh, J., MacKay, E., Mallet-Boucher, M., & Wiggins, N. (2002). Discovering colearning with students in distance education sites. *Nurse Educator*, *27*(4), 182-186.<br>***Level II*** | Four faculty members, one at each distance site and two at the main site, in Canada. Approximately 90 learners participated yearly from three sites. | They studied the first class of students that entered an expanded program in 1995 and 1999 when they graduated. They focused on understanding the phenomenon of becoming nurses within the context of a curriculum that is oriented toward caring and co-learning and that is delivered across three geographically distant sites. | Longitudinal, phenomenological study. Data collection involved open-ended questionnaires, interviews, and focus groups. Common themes were generated by clustering similar codes. There were approximately 12 to 18 audiotaped interviews across the sites. | ■ Overall theme of colearning: Main strength of colearning was "having a small class where you really get to know and work with everyone. It's really close-knit and everyone encourages you to do your best".<br>■ Being able to study in relatively small centers, with small numbers of learners and faculty, created a family-like atmosphere that tended to support learning.<br>■ Findings indicate that orientation to a multisite program must include familiarization with distance technologies for both students and teachers.<br>■ Interaction with profes-sors was important for colearning. | ■ Some distant professors teaching by teleconference had less effective contact with learners; participants indicated that this did influence development of colearning relationships.<br>■ Learners came to like computers because e-mail provided a link to, and interaction with, others, including professors.<br>■ Some nonnursing courses are more difficult to tele-conference and teachers accustomed to lecturing content on campus made learners question the effectiveness of this teaching strategy.<br>■ The required group projects to build colearning contributed to a sense of work overload.<br>■ Reliability of transcriptions wasn't addressed. | ■ There may be benefits of dividing students in larger sites into smaller groups to foster supportive interactions present in smaller groups.<br>■ Interactions with professors remain an important part of learning. |
| McDonald, D. D., Wiczorek, M., & Walker, C. (2004). Factors affecting learning during health education sessions. *Clinical Nursing Research*, *13*(2), 156-167.<br>***Level II*** | The sample size started with 78 college students. The final sample size was 48 (see strengths and weaknesses; third bullet).<br>Average age – 21.4 (± 6.21)<br>White – 79.5%<br>Female – 83.3%<br>Nursing major – | They tested how background noise and being interrupted affect learning health information. | ■ A pre-/post-test, double-blind, two-by-two factorial experiment comparing interruption (interruption/no interruption) by noise (noise/no noise) was used.<br>■ Instruments included a demographic data record and the Antibiotic Resistance Test, where content | ■ The results suggest that noise and interruption during health teaching adversely affects the ability to learn health information.<br>■ The difference in the mean scores was small, but a lack of understanding in any one of the areas could place a person at risk. | ■ The study took place in a university rather than in a health care setting. Health care and university environments might introduce vastly different intrapersonal factors that encourage or inhibit learning.<br>■ The study controlled for confounding factors, such as different teachers, content, frequency, and magnitude of disruption.<br>■ The groups, though formed | ■ Greater effort should be made to create environments with minimal distraction, especially when understanding the health information, is critical.<br>■ People teaching health information should assess the environmental distractions present, develop plans to decrease the factors, |

| Article | Sample | Comparison Studied | Study Procedures | Key Results | Strengths & Weaknesses | Implications for Boards |
|---|---|---|---|---|---|---|
| | 71.8% | | validity and reliability were established.<br>■ The teaching intervention was a five-minute videotape on antibiotic-resistance teaching, and content validity was established.<br>■ Participants were randomly assigned to one of the four groups.<br>■ A data recall task was presented immediately after the videotape, which required the information learned while watching the videotape to be transferred into long-term memory to be recalled.<br>■ Analysis of covariance was used in analysis. | | with random selection, were uneven regarding having taken a microbiology course; therefore, the original findings showed no differences. They found differences when they omitted those students who had taken a microbiology course. However, that decreased their sample size from 78 to 48.<br>■ The distractions and noise were realistic.<br>■ The teaching was only done by videotape, thereby negating teacher/student interaction, which could clarify misperceptions. | complete a cost-benefit analysis for each option, implement changes, and evaluate the effectiveness of the changes for health-learning outcomes. |
| Miller, S. K. (2003). A comparison of student outcomes following problem-based learning instruction versus traditional lecture learning in a graduate pharmacology course. *Journal of the American Academy of Nurse Practitioners*, *15*(12), 550-556.<br>***Level II*** | Convenience sample of 12 APRN students in the control group and 10 APRN students in the intervention group. | The medical literature has studied problem-based learning more comprehensively than nursing. Therefore, this study compared student performance and satisfaction in problem-based learning to a traditional lecture format in pharmacology. | ■ The study design was experimental, post-test only, though the sample wasn't randomly selected.<br>■ They cite that they didn't need a pretest because it was a homogenous sample.<br>■ The same faculty member taught each class.<br>■ The students were blinded to the fact that another teaching method was being used, and the groups were 50 miles apart from each other.<br>■ The Student Satisfaction with Learning Tool had respectable content validity and test-retest reliability.<br>■ No psychometrics were supplied for the midterm exam and final exams.<br>■ The Students' t tests for independent samples were used for analyzing | ■ Student satisfaction scores showed no significant differences between the groups.<br>■ Midterm exams showed no significant differences between the groups.<br>■ Final exam grades showed no significant differences between the groups. | ■ Caution is advised using such a small sample size. The effect size would have had to have been large to have shown significance.<br>■ One intervening variable that the researchers acknowledged was that the intervention group were not only learning new material, but a new learning method at the same time. This could have affected the results.<br>■ Since problem-based learning is thought to improve critical thinking, the difference might be seen in practice, rather than with the exams.<br>■ The psychometrics of the exams were not provided.<br>■ Can the results be generalized to undergraduate nursing students? | ■ This pilot study suggests that problem-based learning may be at least as effective as traditional lecture and should be explored in larger studies.<br>■ The evidence did not support problem-based teaching methodologies over traditional methodologies. |

| Article | Sample | Comparison Studied | Study Procedures | Key Results | Strengths & Weaknesses | Implications for Boards |
|---|---|---|---|---|---|---|
| | | | differences.<br>■ The teacher did not know whether she was grading a control or experimental exam. | | | |
| Murphy, M. (1995). Open learning: the managers' and educationalists' perspective. [Electronic Version]. *Journal of Advanced Nursing*, *21*(5), 1016-1023.<br>*Level II* | Participants for this study were from a college of nursing and its clinical links.<br>Setting was England. | Describe the feelings and motivations of nurse educators and managers toward open-learning programs.<br>The definition they used was that open learning relates to an educational philosophy where the learners have access not just to educational products, but to the means of shaping their own learning. | ■ Qualitative study using guided, standardized interviews with an open-ended, in-depth interview technique.<br>■ Tape-recorded interviews were transcribed verbatim.<br>■ Situation analysis was used, requiring detailed, searching and concrete analysis of the data collected to 'get inside the information."<br>■ A theoretical framework was devised that combines the philosophies of humanistic education and Knowles' andragogical assumptions for learning with concepts of student empowerment and increasing clinical competence. | ■ Both practice and educators valued open-learning as a mode of program delivery appropriate for a practice profession.<br>■ Both groups confused the concepts of open and distance learning.<br>■ All interviewees agreed that open learning would help to close the theory-practice gap.<br>■ The interviewees saw open learning as a way of empowering the learner.<br>■ The findings showed that practice and education aren't working collaboratively, but each are functioning with their own competitive market in mind. | ■ Lack of clarity of definition within both groups as to what exactly open-learning is.<br>■ Sample selection process was not made clear.<br>■ Line-by-line coding of interview transcripts allowed for comprehensive results.<br>■ Researcher acknowledged that some would use the survey method, and yet she cogently argued that the survey method hands over the data collection from the researcher to the informant.<br>■ Researcher acknowledged the lack of rigor with open interviews, and yet she argued that a rigid interview could be dominated by the researcher's agenda. | ■ Educators and practitioners saw clinical experiences as vital in the education of nurses, and open-learning would only be a part of teaching nursing students.<br>■ Open-learning is often confused by nurse educators and managers as being distance-learning. |
| Platzer, H. Blake, D., & Ashford, D. (2000). An evaluation of process and outcomes from learning through reflective practice groups on a post-registration nursing course. [Electronic Version]. *Journal of Advanced Nursing*, 31(3), 689-695.<br>*Level II* | 30 students were followed for two years in England. | Develop a better understanding of the use of groups and discussions to facilitate reflective practice. | ■ Groups were qualitatively evaluated by the use of in-depth, semistructured interviews.<br>■ Interviews were audio-recorded and transcribed. They were analyzed using a qualitative software analysis package (QST NUD-IST version 3).<br>■ The data were coded and categorized as themes emerged. | ■ The students reported significant development in their critical thinking abilities.<br>■ The reported greater autonomy to question the ***status quo***.<br>■ The participants reported a less rule-bound approach to their practice (relates to Benner's work).<br>■ Their learning in the reflective practice groups can best be understood in terms of an increase in professionalism. | ■ Self reports can be biased.<br>■ No measurements of critical thinking were made.<br>■ The reliability of the coding and categorization was not discussed. | ■ Excellent qualitative evidence to support the need for students to reflect in groups and discussions about their practice. |
| Schaefer, K. M. & Zygmont, D. (2003). Analyzing the teaching style of nursing faculty: Does it promote a student-centered or | Sample consisted of 178 females and nine males.<br>Mean age of 50. | ■ Describe the predominate teaching styles of nursing faculty as either teacher-centered or student-centered. | ■ Descriptive correlation design with triangulation of methods was used.<br>■ Principles of Adult Learning scale (PALS) was used to | ■ Participants were more teacher than student centered; their written philosophies revealed both teacher-centered and student-centered approaches. | ■ Nice literature review.<br>■ Investigators met to achieve consensus about themes with the narrative data.<br>■ Questionable generalizability beyond | ■ Excellent suggestions were given for assisting faculty to move to a more student-centered environment, and perhaps the boards of |

| Article | Sample | Comparison Studied | Study Procedures | Key Results | Strengths & Weaknesses | Implications for Boards |
|---|---|---|---|---|---|---|
| teacher-centered learning environment? *Nursing Education Perspectives*, *24*(5), 238-245<br>***Level II*** | | ■ Compare faculty teaching styles to their instructional methods and to their stated philosophies. | measure teacher or student centeredness; good reliability and validity have been reported for this tool.<br>■ Questionnaires were sent to 100 randomly selected baccalaureate programs accredited by NLNAC to be given by the dean to five faculty members. | ■ Faculty used student-centered language in their philosophies, often in a teacher-centered context; therefore, they may have recognized the need for a student-centered environment but had difficulty with implementation.<br>■ A distinction was made between clinical and classroom teaching. The authors questioned whether the philosophy should change according to the teaching venue. | baccalaureate nursing programs accredited by the NLNAC. | nursing could support these.<br>■ It is helpful for faculty to regularly share effective teaching methods with their peers in formal and informal settings. |
| Simmons, B., Lanuza, D., Fonteyn, M., Hicks, F., & Holm, K. (2003). Clinical reasoning in experienced nurses. *Western Journal of Nursing Research*, *25*(6), 701-719.<br>*Level II* | 15 experienced nurses.<br>Five adult med-surg units in a teaching community hospital outside a large Midwestern city.<br>Convenience sample. | Explored cognitive strategies used by experienced nurses as they considered assessment findings of assigned patients. Experienced nurse was defined as practicing from two to 10 years, full-time, on a medical-surgical unit. | ■ Qualitative, descriptive design.<br>■ The think-aloud method was used to assess cognitive processes.<br>■ Participants were tape recorded by an investigator to gather information.<br>■ Each audiotape was transcribed. The text was methodically reviewed using the three steps of protocol analysis: referring phrase analysis, assertional analysis, and script analysis. | ■ The most common thinking strategies used to reason about assessment findings were recognizing a pattern, judging the value, providing explanations, forming relationships, and drawing conclusions.<br>■ Nurses made sense of assessment information by linking concepts together to form relationships.<br>■ These relationships indicated the specific information nurses were concentrating on and determined the direction that their reasoning would take next.<br>■ Years in practice is only one criterion to distinguish between nursing skill level. | ■ Three nurses spoke English as a second language, which may have affected understanding and thinking aloud.<br>■ Few studies of nurses' clinical reasoning have been conducted in a practice setting during actual patient care.<br>■ The number of years in practice may not have been an appropriate indicator of skill level, and the authors acknowledge this. | ■ While this sample was of experienced nurses, it provides insight for teaching strategies with clinical reasoning and critical thinking.<br>■ The think-aloud method is an effective way to access the cognitive processes used in clinical reasoning and might be used by faculty teaching nursing students.<br>■ Although previous research has shown that expert nurses chunk information and employ thinking strategies to speed the reasoning process, this study indicated that experienced nurses (who were not experts) employed similar techniques |
| Thiele, J. E. (2003). Learning patterns of online students. *Journal of Nursing Education*, *42*(8), 364-366.<br>***Level II*** | ■ The sample consisted of 64 students in a baccalaureate program for RN students that completed a three-credit research and informatics course.<br>■ Learning outcomes were compared to 42 generic students. | ■ The objective was to learn how online courses affect learners.<br>■ The researcher also compared students' learning in a traditional course to those in an online course. | ■ The study was conducted during two sequential semesters.<br>■ During each semester, three face-to-face class meetings were conducted. The remaining 12 classes were conducted in an asynchronous format (via e-mail, group discussion board or telephone).<br>■ All assignments were posted online and | These results indicate that the learned information component was higher for the online students than for the traditional students. | ■ Methodology poorly described.<br>■ The comparison of an RN-BSN group to a generic group is inherently flawed.<br>■ The exam procedures were starkly different: The RN-BSN students took the exam online at home, with no time period; no controls were placed on the students, except for personal integrity. Meanwhile the generic students took a 50-minute proctored exam.<br>■ K-R reliability for the exam | ■ Additional research with controlled comparisons between traditional and online courses is needed to expand the knowledge of the effects of Web-based education on learners and learning outcomes.<br>■ Results of this study should be used very cautiously because of the methodological concerns. |

| Article | Sample | Comparison Studied | Study Procedures | Key Results | Strengths & Weaknesses | Implications for Boards |
|---|---|---|---|---|---|---|
| | | | required use of Web resources for completion.<br>■ Learning outcomes were measured with online exams.<br>■ Generic students were taught the same content with a traditional methodology and took an "almost identical" exam. | | was acceptable; no validity data were provided. | |
| Tiwari, A. & Tang, C. (2003). From process to outcome: the effect of portfolio assessment on student learning. *Nurse Education Today*, *23*, 269-277.<br>***Level II*** | The sample consisted of 70 nursing students in the Department of Nursing Studies in The University of Hong Kong.<br>■ 21 second year students were assigned to the treatment group.<br>■ 49 third year students were assigned to the comparison group. | The purpose was to evaluate the effectiveness of portfolio assessment in enhancing student learning.<br>This Paper mainly addressed the qualitative data. | ■ The study involved the use of a nonequivalent control group design, as well as a qualitative component.<br>■ Data collection consisted of the Study Process Questionnaire (SPQ) to measure students' approaches to learning; the Assessment Preparation Strategy Questionnaire (APSQ) to find out how students prepare for their assessments; and semi-structured interviews with selected students (12) to explore their experience and perceptions of the assessment process.<br>■ The audio-recordings were transcribed verbatim to improve trustworthiness. | Three themes emerged from the analysis of the interview transcriptions:<br>■ The students favored the use of portfolio assessment.<br>■ The process of preparing portfolios yielded positive academic and affective outcomes.<br>■ Unexpected findings in the form of spontaneous collaborative learning during the process of preparing portfolios for those students who lacked motivation.<br>The positive academic outcomes were (supported by qualitative comments):<br>■ Gaining a much better understanding.<br>■ Applying what they learn to their professional practice.<br>■ Learning deeply and meaningfully.<br>■ Conceptualizing at a high cognitive level.<br>■ Gain in confidence.<br>■ Pleasure, appreciation and freedom to choose. | ■ Self report data can be biased.<br>■ Intervention was only one semester.<br>■ Other incidental variables could have been a factor, as the authors acknowledge.<br>■ This was only the report of the qualitative results; the quantitative results can be found: Tiwari, A. & Tang, C. (2001). The power of partnership: Enhancing student learning through assessment by portfolio. In: Conway, J. (ed). Research & Development in Higher Education: Vol. 24. Learning Partnerships. The Higher Education Research and Development Society of Australasia, Inc., ACT, pp. 188-194. | ■ Backwash was discussed, and it implies that what the students learn and how they learn depends very much on what they think they will be assessed on; this seems to be very appropriate for those nurse educators who "teach to" the NCLEX.<br>■ The positive academic and affective outcomes suggest that the use of portfolios can have a positive effect on learning. |
| White, A. H. (2003). Clinical decision making among fourth-year nursing students: an interpretive study. *Journal of Nursing Education*, *42*(3), 113-120.<br>***Level II*** | Seventeen senior nursing students (16 women, one man) participated in the study. No students had any type of previous degree in nursing. All students were completing their last semester of coursework in a baccalaureate program. | They studied the essential components of learning clinical decisionmaking among nursing students. | ■ A qualitative methodology was used, Heideggerian phenomenology, with hermeneutical analysis.<br>■ The identification of themes was accomplished through the accepted constant comparative method. | Five themes were identified as components associated with nursing students' clinical decision making:<br>■ Gaining confidence in their skills.<br>■ Building relationships with staff.<br>■ Connecting with patients.<br>■ Gaining comfort in self as a nurse.<br>■ Understanding the clinical picture.<br>The results of the study indicate that until students are able to understand the | ■ Besides using the constant comparison method to identify themes, the investigators asked three students to verify the themes.<br>■ A model was presented to encourage further dialogue.<br>■ A more diverse student sample would have made the study more generalizable. This should be considered for future research. | ■ The importance of students working with staff was paramount.<br>■ When students gained confidence, they were able to shift their focus from themselves to the clinical environment.<br>■ When students worked in the clinical area with patients and mentors, they gained in confidence.<br>■ When students became more comfortable in the |

| Article | Sample | Comparison Studied | Study Procedures | Key Results | Strengths & Weaknesses | Implications for Boards |
|---|---|---|---|---|---|---|
| | | | | clinical picture, their clinical decision making capabilities are limited.<br>The researcher questions whether traditional clinical rotations are as effective as a consistent clinical experience. | | clinical environment, they began to assume the nursing role.<br>■ Until students understand the clinical picture, their clinical decision-making capabilities are limited. Yet, they need knowledge, experience and self-confidence to understand the clinical picture. |
| Yates, P. Jackie, C. Moyle, W. & Wollin, J. (1997). Peer mentorship in clinical education: outcomes of a pilot programme for first year students. *Nurse Education Today*, *17*, 508-514.<br>***Level II*** | 55 of 323 first year students enrolled in the Bachelor of Nursing program agreed to participate. Eight peer mentors were selected from students in the second year of the program to facilitate the sessions. The setting was Australia. 55 randomly selected non-participants served as the controls. | Examine the potential of peer mentorship to assist students to improve their clinical learning outcomes. | ■ Five sessions of one to two hours' duration were held every two to three weeks during the 14-week semester.<br>■ Sessions focused specifically on strategies for negotiating the clinical environment, promoting learning from clinical experience, and debriefing of events and experiences during clinical practicums.<br>■ Measurement included pre- and post-program questionnaires, a focus group interview, review of mentor journals, and a statistical analysis of the differences in clinical ratings between the participants and non-participants. | ■ The program was perceived to provide a considerable amount of help to participating students, particularly in reducing anxiety and increasing confidence.<br>■ There were no differences between the groups related to clinical instructor ratings.<br>■ Mentors felt the program had assisted students with increasing confidence and reduced anxiety.<br>■ Students were less satisfied with issues such as timing and organization of the sessions.<br>■ Students spoke of their concerns about the need for practice of clinical skills to improve their confidence and reduce anxiety. | ■ Evaluations were comprehensive.<br>■ Because the protégés were volunteers, there may have been a systematic bias. | ■ Students feel it is important to integrate both theory and practice.<br>■ Most clinical teachers agree that lack of confidence and anxiety can have detrimental effects on student learning, and the strategy of using peer mentors may assist with this.<br>■ Support strategies, which reduce stress for beginning students are important in nursing programs, since they are likely to contribute to an improvement in student performance and a decrease in student attrition. |

## Conclusion

This is an ongoing project where we are continuing to search for studies that meet the specified criteria. A limitation of any systematic review is that it is only good as the quality of research that it covers. As discussed in strengths and weaknesses, oftentimes sample sizes were small and controls were lacking. The study criteria for this systematic review were not as stringent as some reviews so that the breadth of the literature could be reviewed. The review identifies strengths and weaknesses of the studies so that the reader can decide how to use these findings.

Three Level I systematic reviews were identified. Epstein & Hundert (2002) defined "professional competence" and provided some guidance for boards for assessing the competence of health care workers. Greenhalgh (2001) identified 12 prospective randomized studies of medical students for the purpose of evaluating computer-assisted learning. They suggest that computer-based learning can be effective, though the aim should be to use a variety of teaching strategies. Issenberg et al. (2005) conducted a systematic review of high-fidelity medical simulations for learning and found them to be valuable adjuncts to learning when carried out under the right conditions.

Five of the studies provided evidence that qualified faculty were important for teaching nursing students, though there was no literature about specific qualifications. Two studies specifically identified the need to improve students' confidence levels before they can effectively think critically when caring for patients. Five studies provided evidence that clinical experiences improve students' abilities to think critically when caring for patients, though there were no studies found that investigated specific numbers of clinical hours. Likewise, there were no studies that evaluated those programs that do not have, or have very limited, clinical experiences. Two studies found that reflective practice was a very important strategy for teaching nursing students to critically think. There were four studies that showed no differences in learning outcomes with online courses versus traditional courses, and one found online courses had significantly better student outcomes, though that particular study was not well controlled and should be replicated. Other research investigated some very specific issues, including:

- Validating the need to evaluate structure, process and results/outcomes when evaluating
- programs.
- Validating personal improvement courses for teaching continuous quality improvement.
- Decreasing environmental noises and distractions in order to enhance learning.
- Problem-based learning, compared to traditional learning, was investigated.
- Provided good guidelines for assisting the faculty members in moving towards a more student-centered way of teaching.
- Supported the IOM's recommendation for the importance of interdisciplinary teams in health care.
- Supported the use of portfolios for student learning assessment.
- Recommended the "think aloud" strategy for clinical reasoning.
- Supported peer mentors as a way to increase student confidence levels in clinical situations.