Learning Skills Profiles of Master's Students in Nursing Administration: *Assessing the Impact of Problem-Based Learning*

CONSTANCE M. BAKER, ANNA M. McDANIEL, DANIEL J. PESUT, AND MARY L. FISHER

TODAY'S MARKET-DRIVEN HEALTH CARE DELIVERY SYSTEMS AND EXPECTATIONS FOR CONSOLIDATED NETWORKS IN THE FUTURE HAVE LED TO EFFORTS TO REVISE THE CURRICULA IN GRADUATE-LEVEL NURSING ADMINISTRATION EDUCATION. Nurse managers for today's health care system, and for tomorrow's, need preparation in using critical reasoning, structuring knowledge in clinical practice contexts, collaborating in interdisciplinary teams, using information technology, and participating in continuous quality improvement. Nurse managers must seek broad-based knowledge, have a lifelong commitment to learning, and exhibit ethical behavior. • *This article reports on a study that compares student scores on the Learning Skills Profile (LSP) before and after completing four master's-level nursing administration courses taught using problem-based learning (PBL). The goal is to evaluate PBL as an appropriate pedagogy to prepare nurse managers for the uncertainties of future administrative practice.*

ABSTRACT Attempts to compare graduate student performances before and after introducing new curricula are rare; yet faculties need outcome measures to justify program costs and demonstrate effectiveness. Boyatzis and Kolb's Learning Skills Profile is used to assess the outcomes of a problem-based learning MSN program. Increases were demonstrated among all 12 learning skills; statistically significant increases were found in eight of the personal learning skills and six of the job skill demands. Comparisons are made between scores of students in the MSN program and scores of master's students in business administration.

Understanding Problem-Based Learning PBL is a philosophy and teaching method that structures knowledge in clinical contexts, strengthens motivation to learn, develops clinical reasoning skills, and enhances self-directed and lifelong learning (1). Since 1969, when PBL was introduced in Canada's McMaster University Medical School, various aspects of PBL have been implemented internationally in all areas of the health sciences. It has also been implemented in other academic program areas, including architecture, business, education, and engineering, as well as in elementary education.

A small-group educational method, PBL is characterized by the use of an ill-structured problem as the context for students to learn clinical reasoning skills and acquire specific knowledge. (See Figure 1.) The problem is presented before students have learned basic knowledge, and it is presented in progressive stages to stimulate students to seek additional knowledge. The focus in PBL is on contextually defined knowledge, the collaborative group-centered environment, and the coaching role of faculty.

PBL has several fundamental and unique characteristics: the problem; a small group of students; a tutor or facilitator; a goal-oriented, multisession unit; learning objectives; self-directed learning time; concept mapping; and evaluation (2). The tutor/facilitator actively poses questions and monitors verbal and nonverbal interactions to facilitate the group process and enhance learning. Evaluation is an integral part of each problem-discussion meeting, culminating at the final session with evaluation of the case, the learning resources, the tutor/facilitator, the group, and the students.

Research on outcomes of PBL may exceed the assessment of any other instructional method and underlying philosophy. Two independent and concurrent reviews used meta-analysis to assess 20 years of evaluation research on health-related educational programs using PBL (3,4). Both reviews covered much of the same literature and the conclusions are similar. It was found that medicine probably leads other disciplines in the use of PBL, with well over 200 English-language articles reporting evaluation research. Students in traditional curricula scored higher on standardized tests of factual knowledge, while students in PBL curricula exceeded traditional students in clinical knowledge tests, clinical performance, and satisfaction with academic programs. Faculty satisfaction was higher in schools with problem-based curricula.

Curricular Revision in the Master's Program Indiana University's Master's of Science Program in Nursing Administration is a 42-credit degree, 18 credits of which are in the nursing administration major. Students are required to complete the 18-credit curriculum core before entering the major.

Figure 1. Example of PBL Case Used in the Nursing Administration Master's Program

CASE SYNOPSIS You are the manager of a 90-bed adult surgical service at Community Hospital, a 440-bed acute care nonprofit hospital located in a Midwestern state. After witnessing a novice nurse near miss/adverse event situation, you talk with the four team leaders about engaging the "boomer generation" nurses in mentoring novice nurses to strengthen a healthy work environment and a culture of safety. How will you and the four team leaders develop, implement, and evaluate strategy to build organization capacity for safety improvement activities?

CASE OBJECTIVES

1. Assess hospital work environment to identify facilitators and barriers to creating a culture of safety.
2. Analyze internal and external social-economic-political forces enhancing healthy work environments.
3. Specify evidence-based nurse managers' strategies to develop and retain novice nurses.
4. Contrast nurse manager administration roles with entire surgical nursing staff, the four surgical team leaders, and the hospital nursing administration group.
5. Synthesize recent research on nursing safety improvement activities.
6. Apply American Nurses Association's *The Nurse's Role in Promoting a Culture of Patient Safety.*

KEY CONCEPTS

Patient safety	Organizational culture
Healthy work environments	Multigenerational work force

A redesigned master's program in nursing administration was launched in the fall of 1999 and delivered by executive format, one weekend per month (5). To learn the philosophy and strategies of PBL, faculty attended university-sponsored and national workshops. Financial support to revise courses was obtained through successful competitive proposals for university funding.

Four core courses in the nursing administration major were reconfigured into 10 cases using PBL techniques; PBL techniques are also used in the required practicum. Clinical leaders in nursing administration were invited to participate in case development and practicum revisions.

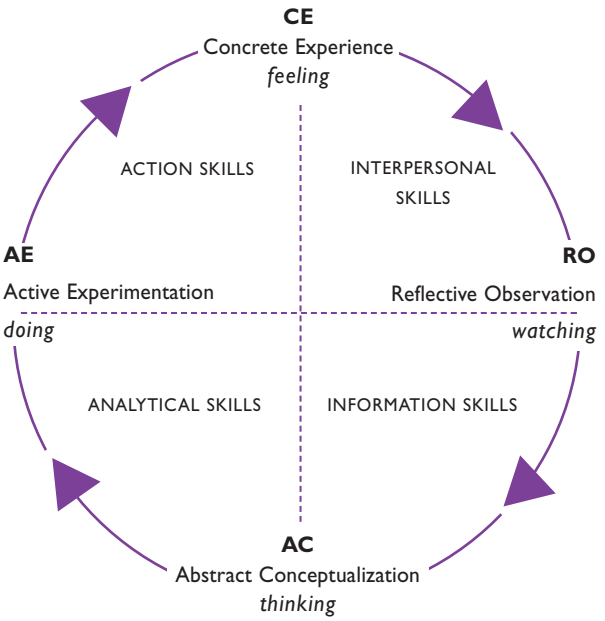
Students read, discuss, and follow Woods's orientation to the PBL process (6). Expectations for student outcomes include information literacy, clinical reasoning, use of a systems

approach, and effective collaboration. The development of savvy professionals who assess learning of self and peers is expected.

An extensive evaluation plan was designed and implemented to assess the quality of the academic program and to demonstrate the faculty's commitment to evidence-based curriculum changes. Evaluation efforts had three focus areas: student, tutor, and program. At the end of each case, students used the Web-based PBL Evaluator to assess their performance and that of their peers and tutor (7,8). Each student had individual assignments and a group project (9). Tutor feedback was provided by a second faculty member who served as a recorder in each case session and noted specific accomplishments and events.

All faculty participate in the university's end-of-course evaluation by students. Program outcomes are specifically assessed using the Chaves, Chaves, and Lantz Web-based PBL Evaluator (8), Boyatzis and Kolb's Learning Skills Profile (10), and Kolb's Learning Style Inventory (11). All programs are assessed within the context of program reaccreditation.

Figure 2. Experiential Learning Cycle and Learning Skills Profile (after Kolb)



Method A descriptive comparative design is used in this study to compare students' scores on the Learning Skills Profile (LSP) before and after completing four master's-level nursing administration courses delivered using PBL. The study explores relationships among three annual cohorts of students.

INSTRUMENT Boyatzis and Kolb's Learning Skills Profile is derived from experiential learning theory's four learning modes: concrete experience (feeling), reflective observation (watching), abstract conceptualization (thinking), and active experimentation (doing) (10,12). A learning skill is a combination of ability, knowledge, and experience that enables a person to do something well within a specific situation and is subject to intentional development (13). The LSP, developed for master's in business administration (MBA) students, measures 12 learning skills believed to be important in management education and is congruent with experiential learning theory's two dimensions of concrete/abstract learning and reflective/active learning as shown in Figure 2 (12).

The following narrative presents the three LSP skills for each of the four experiential learning modes and job-related skill types. Within each of four job-related skill types are three learning skills: 1) interpersonal skills, which include leadership, relationship, and help skills and indicate "concrete experience learning"; 2) information skills, which include sense making, information gathering, and information analysis skills and indicate "reflective observation learning"; 3) analytical skills, which include theory, quantitative, and technology skills and indicate "abstract conceptualization learning"; and 4) behavioral skills, which include goal setting, action, and initiative skills and indicate "active experimentation."

Boyatzis and Kolb report the reliability of the LSP internal scales, measured by Cronbach's alpha, as ranging from 0.618 to 0.917, with an average of 0.778 (10). Similar results were reported by other investigators, most recently Kretovics (14) and Mainemelis, Boyatzis, and Kolb (12). The validity of the LSP was assessed by examining the scale intercorrelations, relationship to the Learning Style Inventory, and the supervisor's point of view (13,15).

The LSP is a 72-item modified Q-sort assessment instrument. Respondents are asked to sort 72 learning skill cards twice, once into seven categories describing their personal skill level and a second time describing skill demands of their job. The skill card distribution is recorded on score sheets and a personal profile is drawn on the LSP model. For this study, data were gathered within the context of a classroom from three cohorts of students before they began and after they completed four nursing administration theory courses; two courses each are offered in the fall and spring semesters. Scores gathered before and after the PBL courses are compared.

DATA ANALYSIS Data were entered into an electronic database for analysis using Statistical Package for the Social Sciences (SPSS), version 13.0. Data were analyzed using descriptive statistics, correlation procedures, and tests to compare means.

Findings SAMPLE Three cohorts of MSN students participated in this project: nine students in 1999-2000, nine in 2000-2001, and 10 in 2001-2002. In all, 28 students completed the LSP. All held BSN degrees and were employed as registered nurses in various managerial and staff positions throughout Indiana and Kentucky.

LEARNING SKILLS PROFILE SCORES Tables 1 and 2 show that LSP scores for the MSN students increased on each of the 12 learning skill outcome measures for both learning skills and job skills. These findings suggest that participation in PBL curricula has a positive impact on the learning outcomes measured by the LSP.

Table 1 shows statistically significant results on eight personal learning skills: leadership, help, sense making, information gathering, theory, quantitative, action, and initiative. These eight learning skills represent each of the four quadrants of the learning skills model and Kolb's experiential learning quadrants (12). In the concrete interpersonal learning phase, nursing administration students are expected to provide leadership, establish relationships, and be sensitive to others. However, the data suggest that the academic programs do not impact their abilities to establish relationships. In reflective observation learning, student scores were significantly higher on sense making and information gathering, but there were no changes in information analysis.

The nursing students scored their highest numerical values in abstract conceptualization. The nursing administration courses increased their abilities in theory and quantitative tools, but did not increase their technology skills, suggesting that students come to nursing administration courses with advanced computer skills. Finally, in active experimentation, students' scores were significantly higher in initiative and action, but not in goal setting.

Table 2 shows statistically significant results on six job skills: help, sense making, information gathering, information analysis, theory, and technology. Five of these job skills represent two of the four quadrants of the learning skills model: three were in information skills for reflective observation and two were in analytical skills for abstract conceptualization. These quadrants reflect "transformation of experience" in the two-factor experiential learning model. Among the six statistically significant job skills, only one, help, was in interpersonal skills for concrete experience. In the two-factor model of experiential learning theory, interpersonal skills reflect "grasping of experience from the environment" (11). These findings suggest that the nursing administration courses had the greatest

Table 1. Analysis of Learning Skills Profile Personal Learning Skills Before and After PBL Courses (N = 28).

Learning Skills	Before PBL Mean	After PBL Mean	t	p value
Leadership	28.04	31.46	-3.4	.002*
Relationship	31.39	33.18	-1.8	.072
Help	29.75	32.61	-4.1	.000*
Sense making	27.71	31.14	-3.1	.004*
Information gathering	27.79	30.32	-2.2	.031*
Information analysis	27.61	29.07	-1.4	.164
Theory	20.32	26.57	-5.2	.000*
Quantitative	19.68	25.21	-4.8	.000*
Technology	24.68	26.89	-1.6	.114
Goal setting	27.36	29.89	-1.9	.062
Action	29.93	33.36	-4.0	.000*
Initiative	29.75	33.36	-3.6	.001*

*significant

Table 2. Analysis of Learning Skills Profile Job Skills Before and After PBL Courses (N = 28)

Learning Skills	Before PBL Mean	After PBL Mean	t	p value
Leadership	35.64	36.36	-0.7	.485
Relationship	35.75	36.75	-1.3	.184
Help	32.82	34.82	-2.3	.025*
Sense making	33.14	35.29	-2.4	.020*
Information gathering	33.75	36.75	-2.8	.008*
Information analysis	30.71	33.46	-2.2	.034*
Theory	26.57	30.82	-3.7	.001*
Quantitative	26.25	29.50	-2.0	.053
Technology	25.82	29.39	-2.4	.020*
Goal setting	34.71	35.18	-0.43	.668
Action	35.00	35.50	-0.55	.581
Initiative	35.64	35.86	-0.26	.793

*significant

Table 3. Differences in Learning Skills Profile Personal Learning Scores Among MSN and MBA Students After Curricular Change, Four-Factor Model (14)

	MSN students N = 28	MBA students N = 39
1. Interpersonal *(concrete experience learning)*		
A. Leadership	Sig	Sig
B. Relationship		
C. Help	Sig	Sig
2. Informational *(reflective observation learning)*		
D. Sense making	Sig	
E. Information gathering	Sig	Sig
F. Information analysis		
3. Analytical *(abstract conceptualization learning)*		
G. Theory	Sig	Sig
H. Quantitative	Sig	Sig
I. Technology	Sig	
4. Behavioral *(active experimentation learning)*		
J. Goal setting		Sig
K. Action	Sig	
L. Initiative	Sig	

impact on personal skills as measured by the LSP and a lesser impact on job skills.

COMPARISON OF MSN AND MBA STUDENTS Differences in LSP scores of MSN students between before and after PBL courses are compared with LSP scores of MBA students before and after an MBA program was updated and revised and then delivered through PBL (14). Table 3 compares scores of MSN and MBA students on the LSP personal learning skills. Differences in before and after LSP scores of both MSN and MBA students are statistically significant in five of the 12 factors: leadership, help, information gathering, theory, and quantitative. MSN students' scores were significantly higher in sense making, action, and initiative, while MBA students' scores were significantly higher in technology and goal setting. Neither group achieved statistical differences in relationship or information analysis.

These findings are interpreted from the perspective of the four phases of learning: concrete experience, reflective observation, abstract conceptualization, and active experimentation. In the concrete interpersonal learning phase, both business and nursing administration students are expected to provide leadership, establish relationships, and be sensitive to others. Although the LSP data suggest that the academic programs do not impact their abilities to establish relationships, questions have been posed regarding LSP sensitivity to establishing relationships. In reflective observation learning, both sets of students were comparable in information gathering and information analysis. Nursing students differed from business students in statistically higher scores in sense making, the ability to adapt to new situations. Both sets of students scored their highest numerical values in abstract conceptualization; their academic programs increased their abilities in theory and quantitative tools. As noted earlier, nursing students did not increase their technology skills. Finally, in active experimentation, nursing students differed from those in business in all three factors: initiative, action, and goal setting.

The graduate program in nursing administration is oriented toward teaching initiative and action to solve problems. The absence of a significant difference in goal setting suggests the need for increased emphasis in the MSN program. The LSP does capture increases on the 12 learning skills outcomes, represents the four quadrants of the learning skills model, and allows for comparisons between two separate disciplines, nursing and business.

Discussion The aim of this study was to assesses the impact of PBL on Learning Skills Profiles of master's students in nursing administration. Outcome assessment in nursing master's degree programs is rare; the use of a standardized assessment tool specifically developed by management faculty for master's degree students is even more rare.

The LSP was developed specifically for MBA students and is appropriate for MSN students in nursing administration because of curricular similarities. The findings of this study indicate that the use of PBL in the master's program increases the learning skills and job skills of students. However, the findings also show no significant change in four of the 12 learning skills and six of the 12 job skills measured. In the personal learning skills, the four skills not showing significant gains are equally distributed, one from each of the four quadrants. However, in the job skills data, the six skills not showing significant gains are disproportionately in the interpersonal and action quadrants.

The nursing administration graduate program is oriented toward increasing leadership skills and relationship building, taking initiative, and experimenting with new ideas. The absence of a significant difference in these six job skills suggests the need for increased emphasis in the graduate program and follow-up by faculty.

Outcomes of the findings were used to focus administrative experiences in the required MSN practicum. Thus, the LSP served as a means of evaluation and became diagnostic and prescriptive in crafting individual learning experiences.

The generalizability of this study is limited because of the small sample size. Future research with nursing administration students might benefit from a control group of currently employed nurse managers with at least five years of experience and no advanced degree.

Conclusion Although the use of outcome assessments in graduate nursing education is rare, changes can be expected with the growing emphasis on evidence-based practice in the clinical services and the quest for a science of nursing education. As demonstrated in this study, graduate faculty in nursing administration have the advantage of being able to select standardized tests designed by management educators for students in business administration (16). The information obtained through outcomes assessment can be used to continually improve the quality of the education program and provide data to internal and external stakeholders, including funding and accreditation bodies.

This study of differences before and after implementing a problem-based learning curricula found several statistically significant results. However, a cause and effect relationship should not be assumed. NLN

About the Authors *Constance M. Baker, EdD, RN, is a professor of nursing and coordinator, International Health Initiatives, Office of International Affairs; Anna M. McDaniel, DNS, RN, FAAN, is a professor of nursing and director, Health Informatics, School of Informatics; Daniel J. Pesut, PhD, RN, FAAN, is a professor of nursing and associate dean for graduate programs; and Mary L. Fisher, PhD, RN, CNAA, is a professor of nursing and chair, Environments for Health. All four faculty are affiliated with the School of Nursing at Indiana University, Indianapolis. For more information, contact Dr. Baker at cbaker1@iupui.edu.*

Key Words Nursing Administration – Master's Program – Problem-Based Learning – Experiential Learning – Master's Program Outcomes

References

1. Baker, C. M. (2000). Problem-based learning for nursing: Integrating lessons from other disciplines with nursing experiences. *Journal of Professional Nursing, 16*(5), 258-266.

2. DeGoeij, A. F. (1997). Problem-based learning: What is it? What is it not? What about the basic sciences? *Biochemical Society Transactions, 25,* 288-293.

3. Albanese, M. A., & Mitchell, S. (1993). Problem-based learning: A review of literature on its outcomes and implementation issues. *Academic Medicine, 68,* 52-81.

4. Vernon, D. T., & Blake, R. L. (1993). Does problem-based learning work? A meta-analysis of evaluation research. *Academic Medicine, 68,*550-563.

5. Baker, C. M. (2000). Using problem-based learning to redesign nursing administration masters programs. *Journal Nursing Administration, 30*(1), 41-47.

6. Woods, D. R. (1997). *Problem-based learning: How to gain the most from PBL* (2nd ed.). Watertown, Ontario: Author.

7. Chaves, J. F., Baker, C. M., Chaves, J. A., & Fisher, M. L. (2006). Assessing MSN students' professional competencies using the Web-based PBL Evaluator. *Journal of Nursing Education, 45*(1),25-31.

8. Chaves, J. F., Chaves, J. A., & Lantz, M. S. (1998). The PBL-Evaluator: A web-based tool for assessment in tutorials. *Journal of Dental Education, 62,* 671-674.

9. Baker, C. M., Bingle, J. M., Hajewski, C. J., Radant, K. L., & Urden, L. D. (2004). Advancing the Magnet Recognition Program in master's education through service-learning. *Nursing Outlook, 52*(3), 134-142.

10. Boyatzis, R. E., & Kolb, D. A. (1991). Assessing individuality in learning: The Learning Skills Profile. *Educational Psychology, 11*(3/4), 279-295.

11. Kolb, D. (1984). *Experiential learning as the science of learning and development.* Englewood Cliffs, NJ: Prentice-Hall.

12. Mainemelis, C., Boyatzis, R. E., & Kolb, D. A. (2002). Learning styles and adaptive flexibility: Testing experiential learning theory. *Management Learning, 33*(1), 5-33.

13. Boyatzis, R. E., & Kolb, D. A. (1995). From learning styles to learning skills: The executive skills profile. *Journal of Managerial Psychology, 10*(5), 3-17.

14. Kretovics, M. A. (1999). Assessing the MBA: What do our students learn? *Journal of Management Development, 18*(2), 125-133.

15. Kaskowitz, G. (1995). Factor analysis of the model constructs suggested by Kolb's learning skills profile. *Perceptual & Motor Skills,* 80(2), 479-487.

16. Boyatzis, R. E., Cowen, S. S., Kolb, D. A., & Associates. (1995). *Innovation in professional education: Steps on a journey from teaching to learning.* San Francisco: Jossey-Bass.