

## LOCUS OF CONTROL IN NURSING STUDENTS ON A PROBLEM-BASED LEARNING PROGRAM: A LONGITUDINAL EXAMINATION

---

HATICE MERT, SEVGI KIZILCI, ÖZLEM UĞUR, ÖZLEM KÜÇÜKGÜÇLÜ,  
AND DILEK SEZGIN  
*Dokuz Eylül University*

In this survey carried out over a 4-year period we explored the changes perceived in the locus of control (LOC) of 58 nursing students enrolled in a baccalaureate nursing education program with an integrated problem-based learning curriculum. The results suggested that there was a statistically significant difference in LOC between the first and second years. A significant difference was found in the mean scores of the students according to year in personal control, fatalism, and belief in an unfair world. But, when analyzed further, there were no significant differences according to year in personal control and belief in an unfair world. However, a statistically significant difference was found in fatalism between the first- and third-year students. Implications for nursing training programs and curriculum development are discussed.

*Keywords:* locus of control, nursing students, problem-based learning.

*Locus of control (LOC)* is defined as *a person's perception of control over his/her own life and how he/she copes with events* (Dağ, 1997). Researchers have described two potential sources of LOC for individuals: internal and external. Rotter (1966) theorized that individuals with an internal LOC believe that they have control over things that happen to them while those with an external LOC believe that outside forces influence them. Individuals with an internal LOC have been characterized as active, effective, talented in problem solving, highly motivated, self-confident, and successful in personal life, school, and work. Conversely, individuals with an external LOC have been described as passive,

---

Hatice Mert, Sevgi Kızılcı, Özlem Uğur, Özlem Küçükgüçlü, and Dilek Sezgin, School of Nursing, Dokuz Eylül University.

Correspondence concerning this article should be addressed to: Hatice Mert, School of Nursing, Dokuz Eylül University, 35340 Inciralti, Izmir, Turkey. Email: [hatice.mert@deu.edu.tr](mailto:hatice.mert@deu.edu.tr)

less motivated than those with an internal LOC, and incapable of solving problems (Abaan et al., 2001; Dağ, 1997).

Locus of control is a self-perception, a byproduct of a multitude of experiences with internal and external factors, which is affected by individual, environmental, and cultural variables. For example, the method of teaching used in an education system can be considered an important environmental variable affecting a student's LOC. However, results from studies regarding the effect of education method on LOC have been inconsistent. Abaan et al. (2001) examined the relationship between LOC and education method with a group of nursing students and found that students at the end of the school term showed an increased tendency toward internal LOC. In a longitudinal study of university students enrolled in various programs including nursing, Yeşilyaprak (2000) found a significant improvement in internal LOC at the end of four years of education. In contrast, Ponto (1999) found no significant difference in LOC scores among first-, second-, and third-year nursing students. Furthermore, she noted that her participants had higher external LOC scores than other student populations in previous studies.

The concept of LOC can play an important role in nursing education. For example, a nurse can benefit from internal LOC when faced with the health demands of society. Nurses who possess an internal LOC perceive themselves as efficacious when making decisions and participating in interventions amidst constraints and orders. This might impact on their ability to provide health care.

Duman and Çankaya (2006) found that the internal LOC levels of third- and fourth-grade students were significantly different from those of first-grade students. Likewise, Karayurt and Dicle (2008) found a significant difference in mean LOC scores of students in different years of a program, with a greater tendency towards internal LOC among third- and fourth-year students. However, at the end of a 12-week problem-based learning (PBL) course, Martin, West, and Bill (2008) found that their participants' internal LOC increased, although this increase was not statistically significant. Sengün and Duman (2005) examined the LOC of nursing students educated by the PBL method and found no difference in LOC between the classes.

*Problem-based learning* results from *the process of working toward the understanding or resolution of a problem* (Barrows & Tamblyn, 1980, p. 18). In the PBL process, learning is student-centered; teachers act as guides/directors and students learn new information through defining their learning targets, taking responsibility in planning and conducting learning tasks, and assessing their own progress (Donner & Bickley, 1993). Results of studies in which the effectiveness of PBL have been demonstrated have shown that the PBL process can increase self-confidence and develop a greater aptitude for independent learning, critical thinking, problem solving, and communication (Choi, 2004; Cooke & Moyle,

2002; Morales-Mann & Kaitell, 2001; Rideout et al., 2002). The PBL process and its impacts are estimated to increase internal motivation and develop internal LOC (Dolmans, Snellen-Balendong, Wolfhagen, & Van Der Vleuten, 1997; Pierson, 1996).

Understanding how students' LOC functions is considered to be important in determining and planning teaching methods and structuring the overall educational environment. Although researchers have examined LOC among nursing students who have been taught using different teaching modalities, these studies have been cross-sectional; no longitudinal study has been conducted in which LOC has been examined in a school where the teaching program is based on PBL. Our purpose in this study was to examine the development of students' LOC in a nursing school, by investigating change in LOC mean scores on five LOC subscales during a four-year nursing education program based on an integrated PBL curriculum. The results of this study could be used to plan more effective PBL educational content and curricula, with the objective of increasing students' internal LOC.

## Method

### Participants and Procedure

This study was carried out at the School of Nursing, Dokuz Eylül University, located in western Turkey. The study sample consisted of all the students (all female) who commenced studying in the 2005–2006 academic year ( $N = 76$ ). However, the number of students who participated in the study during all four academic years was 58 (response rate = 76%). All students entered the program directly from secondary school. The mean age of students in the first year was  $19.61 \pm 1.11$  years.

This school has followed an integrated PBL curriculum since the 1999–2000 academic year. PBL is a student-centered model whereby theoretical knowledge and practice are integrated with the aims of creating knowledge and improving skills (Savery, 2006). In general, PBL classes consist of between 8 and 12 students and course objectives are determined by the students with guidance from tutors. During the class sessions, students are presented with problems that include a number of concepts and issues. They have control over their choice of which issues to pursue, their identification of individual learning needs, and their selection of resources to use. Communication skills, ethical issues, critical thinking, assessment, technical skills, and clinical skills practice are integrated into each module and into all levels of the core curriculum.

Study data were collected in the fall semester of each of four years starting in the 2005–2006 academic year. The survey form was completed by each student under the supervision of the instructors and during class time.

### Instruments

**The Locus of Control Scale.** This scale was adapted from the work of Rotter (1966) by Dağ (2002), who developed a Turkish version of the Locus of Control Scale. The score on the internality-externality dimension measures the individual's general expectation or belief about the internal or external reinforcers that have a significant influence on that individual (luck versus destiny).

Reliability and validity of the 47-item LOC Scale was confirmed by Dağ (2002); Cronbach's alpha coefficient for internal consistency was .92 and test-retest reliability was .88. The scale also had content (face) and construct (factor analysis) validities. In our study, the Cronbach's alpha coefficient was .93. This scale was designed to be used with individuals aged 17 years or older who have completed at least secondary education. The scale has 47 items, scored on a 5-point Likert-type scale as follows: 1 = *not at all possible*; 2 = *not possible*; 3 = *possible*; 4 = *very possible*; 5 = *highly possible*. Twenty-two items are reverse-scored and the total score can range from 47 to 235. The LOC Scale has five subdimensions: personal control, belief in luck, meaninglessness of struggle, fatalism, and belief in an unfair world. A higher score indicates greater belief in external LOC.

### Data Analysis

SPSS version 15.0 was used for data analysis. Differences in LOC scores during the study period were tested using repeated measures analysis of variance (ANOVA). For all tests a significance level of .05 was used. Bonferroni correction was applied to determine which group, if any, was significantly different from any other. Because six comparison tests were included in the analyses, the level of significance was divided by six (.05/6), resulting in a Bonferroni significance level of .008.

### Ethical Consideration

Ethical approval was obtained from the Ethics Review Board of the School of Nursing. Students were informed about the study prior to agreeing to participate and were assured that their participation in the study was entirely voluntary.

## Results

The LOC scores of the nursing students by academic year are shown in Table 1. A significant difference was found between the mean LOC scores of the students according to year. Further analysis revealed that LOC mean scores were statistically significant difference for the first- and second-year students ( $t = 4.055, p = .001$ ).

Table 1. Comparison of Students' Locus of Control Mean Scores According to Program Year

	Year	LOC score <i>M</i> ( <i>SD</i> )	<i>F</i>	<i>p</i>
First year	(2005–2006)	105.68 (20.45) <sup>a</sup>	5.524	.002
Second year	(2006–2007)	96.60 (17.39) <sup>b</sup>		
Third year	(2007–2008)	97.98 (22.31) <sup>c</sup>		
Fourth year	(2008–2009)	102.76 (23.46) <sup>d</sup>		

Note:  $n = 58$ ;  $b < a$ ;  $c = d$ .

Mean LOC subscale scores by academic year are shown in Table 2. A significant difference was found between the mean scores of the students according to year of study in personal control, fatalism, and belief in an unfair world. Further Bonferroni analysis demonstrated that there were no significant differences among the years in personal control and belief in an unfair world. However, for fatalism, a statistically significant difference was found between the first and third year students ( $t = 4.010$ ,  $p = .001$ ) ( $c < a$ ;  $b = d$ ).

Table 2. Comparison of Students' Locus of Control Sub-Scale Mean Scores According to Program Year

Subscale	Year	LOC score <i>M</i> ( <i>SD</i> )	<i>F</i>	<i>p</i>
Personal control	First year (2005–2006)	40.88 (10.22) <sup>a</sup>	<b>4.059</b>	<b>.011</b>
	Second year (2006–2007)	37.14 (9.42) <sup>b</sup>		
	Third year (2007–2008)	37.97 (11.98) <sup>c</sup>		
	Fourth year (2008–2009)	40.45 (11.87) <sup>d</sup>		
Belief in luck	First year (2005–2006)	28.09 (6.51)	<b>2.156</b>	<b>.104</b>
	Second year (2006–2007)	26.09 (4.88)		
	Third year (2007–2008)	26.05 (5.72)		
	Fourth year (2008–2009)	26.60 (6.74)		
Meaninglessness of struggle	First year (2005–2006)	18.71 (4.00) <sup>a</sup>	2.757	.051
	Second year (2006–2007)	17.22 (3.80) <sup>b</sup>		
	Third year (2007–2008)	17.60 (4.98) <sup>c</sup>		
	Fourth year (2008–2009)	18.40 (4.32) <sup>d</sup>		
*Fatalism	First year (2005–2006)	8.83 (2.63) <sup>a</sup>	5.279	.003
	Second year (2006–2007)	7.88 (2.15) <sup>b</sup>		
	Third year (2007–2008)	7.47 (2.04) <sup>c</sup>		
	Fourth year (2008–2009)	7.76 (1.92) <sup>d</sup>		
Belief in an unfair world	First year (2005–2006)	9.19 (2.97) <sup>a</sup>	3.948	.013
	Second year (2006–2007)	8.28 (1.97) <sup>b</sup>		
	Third year (2007–2008)	8.90 (2.81) <sup>c</sup>		
	Fourth year (2008–2009)	9.55 (2.97) <sup>d</sup>		

Note:  $n = 58$ ; \* $c < a$ ;  $b = d$ .

## Discussion

In this study we examined the development of LOC among nursing students from Dokuz Eylül University during a four-year training program, in which PBL methods are used. It was found that LOC scores were high in the first year and reduced in the second and third years. Given that higher LOC scores reflect a greater external LOC, these results can be interpreted as indicating that students were more externally controlled in the first year and showed a tendency to develop an internal LOC in the second and third years, thereby developing strategies to increase their own sense of autonomy.

In a previous study conducted with nursing students, Yılmaz and Kaya (2010) found that the number of years of study was relevant to the adaptation, maladaptation, and internal/external control of their participants. They also suggested that adaptation and internal locus of control develops as students spend more time in the school (Yılmaz & Kaya, 2010). In PBL, students' effective learning and development of strategies assist them in increasing their own autonomy (Martin et al., 2008). Because an internal locus of control may increase with increasing years of education, students in this study were expected to have the greatest LOC in the fourth year. However, contrary to expectations, students showed a tendency still to have an external LOC in their fourth year of study.

In the nursing school where this study was conducted, fourth-year students practice for 32 hours per week and are expected to plan ahead for their careers. In line with this expectation, students become more attuned to a multitude of factors, including their clinical environment, institutional policies, responsibilities of patient care, teamwork, and working with the head nurse and clinic nurses. All these factors could have an impact on the tendency toward an external LOC. Being guided by team members in a clinical environment might, therefore, decrease internal LOC. Deary, Watson, and Hogston (2003) established that expectations from the clinical field and the responsibilities of nursing students increased during the third year and they required greater emotional support than during the second year. An individual's tendency toward external LOC reduces his/her autonomy, leading to decreased self-efficacy and adaptability (Martin et al., 2008). Declining self-efficacy in nursing education has been associated with feelings of inadequacy and approval/disapproval in nurses' future occupational life (Edwards, Burnard, Bennett, & Hebden, 2010). Therefore, our results in this study suggest a need to review the curriculum.

We found a significant difference in mean scores for personal control, fatalism, and belief in an unfair world. In personal control, students were externally controlled in the first year and internally controlled in the second and third years. The reduction in the LOC scores as the students progressed through the course could be explained as reflecting an increase in their personal control.

However, in this study, the students' mean scores in the fourth year were similar to those in the first year and their scores for personal control beliefs were found to be low. Perhaps our participants had a tendency toward an external LOC and consequently, had difficulty in managing problems they were facing, thus causing a decline in their level of personal control. As Deary et al. (2003) reported, the emotional tensions that students face in the clinical environment in the fourth year of their training could decrease their perceptions of personal control.

A statistically significant difference was found between the level of fatalism of first- and third-year students. Students having a tendency toward an external LOC in the first year may have then developed learning strategies that increased their autonomy by the third year and hence they did not have a fatalistic approach. Ofori and Charlton (2002) reported that students with an internal LOC had moderate academic anxiety and less pessimism and fatalism. The belief in an unfair world scores of first- and fourth-year students were similar and indicated external LOC, while scores of the second and third years were similar. It was also found that belief in an unfair world reduced as students progressed through the four-year course, but after further analyses there was no statistically significant difference between the years. This result could suggest an increase in the individuals' self-confidence. However, in their final year of training, nursing students working in a clinical environment have difficulty adapting to that environment and solving the problems they encounter and this may be the reason that they had a high score in that year for belief in an unfair world.

No difference was observed among the years for belief in luck and meaninglessness of struggle. Researchers have indicated that these two variables are related to personal characteristics (Yılmaz & Kaya, 2010).

LOC can be seen as a personality variable in understanding the students (Çolak, 2006). Students may graduate from nursing programs without being sufficiently robust and adaptable for the working environment they will encounter. Several researchers have suggested that such maladaptation could be related to levels of stress and responsibility (Evans, 2001; Evans & Kelly, 2004). In order to reduce stress, we suggest that training should be aimed at enhancing personality development as well as learning skills. In addition, nursing tutors should determine the needs of the students individually, follow their development, and provide regular feedback (Ofori & Charlton, 2002). If an individual's LOC is the result of their educational background, as we are assuming, all educational institutions should ensure that their programs allow students to develop internal LOC. Those factors in the clinical environment affecting LOC, as a part of the education, should also be researched further.

This study was limited by the lack of a comparison of nursing students in a PBL program with nursing students enrolled in traditional programs. It is possible that students in all programs develop a greater internal LOC and more confidence

over time. Thus, a comparison of LOC development over time between students in traditional versus PBL programs would add to understanding of the PBL-LOC relationship.

## References

- Abaan, S., Bulut, H., & Cihangir, N. (2001). Evaluation of a locus of control development program in a university nursing school [In Turkish]. *First international and Fifth national nursing education congress book* (pp. 215-217). Nevsehir: Ozlem Grafik.
- Barrows, H., & Tamblyn, R. (1980). *Problem-based learning: An approach to medical education*. New York: Springer.
- Choi, H. (2004). The effects of problem-based learning on the metacognition, critical thinking, and problem-solving process of nursing students [In Korean]. *Taehan Kanho Hakhoe Chi*, *34*, 712-721.
- Çolak, E. (2006). Examination of the locus of control of technical teachers according to their sex, age and achievement level [In Turkish]. *Edu*, *7*, 1-14.
- Cooke, M., & Moyle, K. (2002). Students' evaluation of problem-based learning. *Nurse Education Today*, *22*, 330-339.
- Dağ, I. (1997). Rotter's internal-external locus of control scale. In I. Savaşır & N. H. Şahin (Eds.), *Evaluation in cognitive-behavioral therapy: Frequently used instruments* (pp. 93-100). Ankara: Turkish Corporation of Psychologists' Publication.
- Dağ, I. (2002). Locus of Control Scale: A study on the reliability and validity of the scale [In Turkish]. *Turkish Journal of Psychology*, *17*, 77-90.
- Deary, I. J., Watson, R., & Hogston R. (2003). A longitudinal cohort study of burnout and attrition in nursing students. *Journal of Advanced Nursing*, *43*, 71-81.
- Dolmans, D. H. J. M., Snellen-Balendong, H., Wolfhagen, I. H. A. P., & Van Der Vleuten, C. P. M. (1997). Seven principles of effective case design for a problem-based curriculum. *Medical Teacher*, *19*, 185-189.
- Donner, R. S., & Bickley, H. (1993). Problem-based learning in American medical education: An overview. *Bulletin of the Medical Library Association*, *81*, 294-298.
- Duman, Z. C., & Çankaya, P. (2006). An exploration of factors which effect locus of control of nursing students [In Turkish]. *Dokuz Eylül University third active education congress book* (pp. 22-34). İzmir: Dokuz Eylül University.
- Edwards, D., Burnard, P., Bennett K., & Hebden, U. A. (2010). A longitudinal study of stress and self-esteem in student nurses. *Nurse Education Today*, *30*, 78-84. <http://doi.org/gp4>
- Evans, K. (2001). Expectations of newly qualified nurses. *Nursing Standard*, *15*, 33-38.
- Evans, W., & Kelly, B. (2004). Pre-registration diploma student nurse stress and coping measures. *Nurse Education Today*, *24*, 473-482. <http://doi.org/gp5>
- Karayurt, Ö., & Dicle, A. (2008). The relationship between locus of control and mental health status among baccalaureate nursing students in Turkey. *Social Behavior and Personality: An international journal*, *36*, 919-930. <http://doi.org/gp6>
- Martin, L., West, J., & Bill, K. (2008). Incorporating problem-based learning strategies to develop learner autonomy and employability skills in sports science undergraduates. *Journal of Hospitality, Leisure, Sport and Tourism Education*, *7*, 18-30. <http://doi.org/gp7>
- Morales-Mann, E. T., & Kaitell, C. A. (2001). Problem-based learning in a new Canadian curriculum. *Journal of Advanced Nursing*, *33*, 13-19. <http://doi.org/gp8>
- Ofori, R., & Charlton, J. P. (2002). A path model of factors influencing the academic performance of nursing students. *Journal of Advanced Nursing*, *38*, 507-515. <http://doi.org/gp9>

- Pierson, H. (1996). Learner culture and learner autonomy in Hong Kong Chinese Context. In R. Pemberton, E. Li, W. Or, & H. D. Puson (Eds.), *Taking control: Autonomy in language learning* (pp. 49-58). Hong Kong: Hong Kong University Press.
- Ponto, M. T. (1999). Relationship between students' locus of control and satisfaction. *British Journal of Nursing*, 8, 176-181.
- Rideout, E., England-Oxford, V., Brown, B., Fothergill-Bourbonnais, F., Ingram, C., Benson, G., ... Coates, A. (2002). A comparison of problem-based and conventional curricula in nursing education. *Advances in Health Sciences Education*, 7, 3-17. <http://doi.org/gqb>
- Savery, J. R. (2006). Overview of problem-based learning: Definitions and distinctions. *The Interdisciplinary Journal of Problem-Based Learning*, 1, 9-20.
- Sengün, F., & Duman, Z. C. (2005). The relationship between locus of control and self-directed learning readiness level among nursing students [In Turkish]. *Dokuz Eylül University second active education congress book* (pp. 236-246). İzmir: Dokuz Eylül University.
- Yeşilyaprak, B. (2000). University students' beginning and leaving characteristics from the aspect of self-respect, assertiveness and locus of control: A longitudinal study [In Turkish]. *The Turkish Journal of Vocational Training*, 2, 1-6.
- Yılmaz, A., & Kaya, H. (2010). Relationship between nursing students' epistemological beliefs and locus of control. *Nurse Education Today*, 30, 680-686.

