

RELATIONSHIPS BETWEEN CLASSROOM THEORY AND CLINICAL PRACTICE

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One might expect students with a strong theory base to do better in clinical situations than peers with a weaker theory grasp, yet nursing instructors all are aware of situations where transfer and application of knowledge and skills do not flow easily. A strong theoretical student may, in fact, be only functioning at a fair level clinically while a weaker student in the classroom may achieve high marks in a clinical setting.

What is the relationship between students' grades in theory and their grades in clinical settings? And are grades within the school reflective of achievement in the entrance examinations to the profession? These questions led to a study of the relationship between scores achieved by second-year students at the University of British Columbia in the classroom, in the clinical setting, and in outside examinations such as the National League of Nursing (NLN) Achievement Tests and the Canadian Nurses' Association-sponsored Registered Nurse (RN) Examinations.

Other studies have indicated that State Board Examinations (SBE, the equivalent of the Canadian RN examinations) and the NLN Achievement Tests measure cognitive ability but are not indicative of job performance (Bell, 1976; Brand, Hastie and Schumann, 1966). Several studies have shown positive correlation existing between the NLN examinations and the SBE, particularly with Medical-Surgical, Psychiatric, and Public Health areas (Brandt, 1966).

PURPOSE

The basic purpose of the study carried out during and following the 1976-77 academic year was to determine the relationship among various theoretical and clinical grades given in the second year of the program at the University of British Columbia.

Specific questions explored included:

1. What is the degree of relationship between the grades received in theory components and those received in clinical practice components?
2. What is the degree of relationship between multiple choice and short answer questions on examinations in theory?
3. What is the degree of relationship between scores received in similar areas of clinical nursing to the NLN and RN scores?
4. What is the degree of relationship between the clinical rotation

sequence and the grades in the nursing course, and the NLN and RN scores?

Study Group

The population consisted of 105 second-year nursing students at the University of British Columbia School of Nursing. Students had patient care experience incorporated in their first-year nursing course in addition to electives. Clinical placements in Medicine, Surgery, Psychiatry, and Pediatrics occurred in second year, followed by a return to one area and then a consolidation experience combined with a leadership component. On successful completion of second year, students wrote their RN examinations. Following completion of another two years these students would receive their B.S.N. degree.¹

METHODOLOGY

Methods used to measure student development in second year included clinical evaluations, three examinations (December, April, and July), and two formal papers (February and July). After each clinical rotation and after each examination (school, NLN and RN), students' grades were recorded in order to facilitate processing of data. Pearson Product Moment Correlations were used and were summarized in a matrix to determine areas of relationships. The data were processed by computer.

FINDINGS

Relationship Between Theory and Clinical Grades

Success in the nursing course during the winter program was strongly correlated to success in the summer term program ($r = .61$). (see Figure 1) Examination results were strongly correlated with winter and summer term nursing course marks ($r = .66, .76, .59$). The April examination was a better indicator of clinical performance than the December or July examinations. No significant correlation was shown between the first clinical rotation and the December examination ($r = .12$), nor between the July examination and the summer clinical rotations. In contrast, correlation was $r = .41$ and $.46$ between the April examination and the second and third rotations.

The formal paper marks did not relate well to either examination or clinical scores, and the February paper was negatively but not significantly correlated with the summer paper.

The student who did well in clinical did well in her overall course grade. Correlations indicate that clinical grades accounted for 27-58% of the variance. The student who did well in one clinical rotation also did well in other clinical rotations, with the strongest correlation being between the second and third placements.

Figure 1

Correlation of Examinations, Clinical, and Total Second Year Scores																
EXAMINATIONS	EXAMINATIONS						CLINICAL						TOTALS			
	December	M.C.	S.A.	April	M.C.	S.A.	July	M.C.	S.A.	I	II	III	IV	V	VI	Winter Course
December (60)																
Multiple Choice (63)	.89															
Short Answer (35)	.80	.45														
April (70)	.60	.52														
Multiple Choice (90)	.56	.47	.96													
Short Answer (35)	.56	.50	.45	.84	.66											
July (100)	.50	.40	.49	.58	.58	.43										
Multiple Choice (54)	.41	.36	.35	.52	.52	.38	.84									
Short Answer (31)	.43	.30	.46	.44	.43	.34	.80	.36								
CLINICAL																
Rotation I (80)	.12	.13	.06	.18	.17	.17	.11	.12	.08							
Rotation II (80)	.38	.36	.29	.41	.36	.43	.25	.28	.16	.38						
Rotation III (80)	.27	.27	.17	.46	.39	.49	.30	.24	.28	.27	.61					
Rotation IV (60)	.24	.21	.22	.25	.25	.20	.35	.26	.32	.07	.26	.28				
Rotation V (60)	.29	.24	.26	.19	.17	.18	.26	.20	.24	.28	.26	.31	.24			
Rotation VI (60)	.25	.29	.12	.11	.09	.12	.04	-.05	.13	.21	.24	.32	.20	.23		
TOTALS																
Winter Course (400)	.66	.60	.52	.76	.70	.69	.52	.48	.41	.52	.76	.74	.34	.35	.30	
Summer Course (300)	.52	.46	.46	.44	.41	.38	.59	.44	.49	.32	.43	.44	.64	.64	.59	.61

Degree of Significance: for 100 students
for 30 students

1% $r = .23$ 5% $r = .19$
1% $r = .41$ 5% $r = .35$
* * = 5% degree of significance

* = 1% degree of significance

Relationship Between Examination Scores

The relationships indicate that the students who did well on their December examination also did well on April and July examinations. The correlations of .60 and .50 were not only significant at the one percent level of significance but also explain 25-35% of variance. Further breakdown indicated those who did well on the multiple choice questions also did well on the short answer section (December $r = .45$, April $r = .66$, July $r = .36$), with the highest correlation occurring in the April examination.

Relationship Between Clinical Scores and the NLN and RN Scores

There was significant correlation between all NLN Achievement, RN examination results and the winter and summer nursing course results, with one exception: the NLN Child examination and the summer course. The NLN scores correlated higher than the RN scores with the nursing course. Figure 2 shows the relationships between the NLN Achievement Tests, the RN examinations and the nursing courses. The relationship between the specific clinical area of practice and that particular NLN and RN score was highest for the Medical rotation and examinations, and then the Pediatric rotations and their NLN and RN examinations.

Relationships Between Clinical Rotation Sequence and Grades

There was little difference in overall marks, clinical and theory scores, by sequence group. Grand mean scores ranged from 287 - 295 out of a total possible range of 400 in the winter term nursing course and from 229-235 of a possible 300 marks in the summer nursing course. (The mark breakdown is given in figure 1 for each of the components of the winter and summer term courses. The February and July formal papers were 30 and 20 marks respectively). These scores were the grand mean totals of the students in each sequence pattern for their total grades in the winter and summer nursing courses. Little difference existed for theory and group mean scores varied only 7 and 11 marks for the winter and summer term clinical courses of a possible 240 and 180 marks.² However, on closer examination, the sequence utilized did appear to make some difference. The Pediatric, Medicine, Surgery, and Psychiatry sequence had a correlation between clinical and theory of $r = .59$ whereas the group who did Psychiatry, Pediatrics, Medicine and then Surgery had a correlation of $r = .19$. The total class correlation between clinical and theory was $r = .44$ for the winter term course. The summer term course correlation between clinical and theory was $r = .54$ and the sequence of Medicine, Surgery, Psychiatry and Pediatrics had a correlation of

Figure 2
Correlation of Second Year, NLN, and RN Scores

	Winter Course Total	Summer Course Total	Nursing Care I	NLN Achievement Tests		
				Newborn	Child	Psychiatry
<u>NLN Achievement Tests</u>						
Nursing Care Pt. I	<u>.58</u>	<u>.35</u>				
Newborn	<u>.60</u>	<u>.35</u>				
Child	<u>.56</u>	<u>.19</u>				
Psychiatry	<u>.55</u>	<u>.26</u>				
Basics	<u>.45</u>	<u>.31</u>				
<u>RN Examinations</u>						
Medicine	<u>.52</u>	<u>.36</u>	<u>.55</u>			
Surgery	<u>.52</u>	<u>.32</u>	<u>.60</u>			
Obstetrics	<u>.48</u>	<u>.35</u>		<u>.44</u>		
Pediatrics	<u>.47</u>	<u>.23</u>			<u>.56</u>	
Psychiatry	<u>.45</u>	<u>.40</u>				<u>.53</u>
Degree of significance: for 100 students 1% $r = .23$ 5% $r = .19$						
for 30 students 1% $r = .41$ 5% $r = .35$						
— = 1% degree of significance						
= 5% degree of significance						

$r = .65$. In contrast, the group doing sequence Medicine, Surgery, Pediatrics and then Psychiatry had $r = .32$, therefore being considerably lower.

The sequence of rotations appears to have had some effect on the NLN and RN scores. The first rotation in the nursing course proved not to be significant as an indicator of success on the NLN or RN examinations, whereas Medicine as a second rotation was correlated significantly. The Surgical rotation proved a stronger indicator as the year progressed for the RN examinations. There was little to no significant relationship between the Psychiatric and Pediatric clinical scores, and the NLN and RN scores.

DISCUSSION AND IMPLICATIONS

Students who do well on examinations tend to continue to do well on future examinations. However, those who did well on multiple choice questions were not consistently the ones who did well on the short answer questions. Perhaps this points to the need for examinations to contain a variety of testing methods such as multiple choice, short answer, essay, true and false, and matching questions to assess the students' overall understanding of course content.

Those students who did well on the December examination continued to do well the remainder of the year. This finding may lead to

greater emphasis on identifying weaker students and providing counselling services for them at this time.

Theoretical scores did not correlate highly with all clinical scores. No correlation was found between the first rotation and the December examination. Only for the April examination did the clinical and theory scores show any interrelationships. This reinforces the belief that nursing is a complex combination of behaviours, attitudes, knowledges, and skills; development of proficiency in applying this combination requires more than just an understanding of theory. Furthermore, the student needs to display ability to apply theory in caring for clients who are both ill and well.

Evaluation of all these components requires many forms of testing procedures. It therefore seems reasonable that the student who does well in one area may not perform as well in another, even when both parts are needed. The transfer and application of the information perhaps requires a different thinking process which may not be demonstrated on paper.

Clinical scores strongly correlated with success in the course and the correlation became progressively higher as the year continued, to the point where the second and third rotations were highly related to success in the winter term nursing course. Similarly, success in the summer clinical placements was highly correlated with higher course grades. Perhaps as students became more knowledgeable and had clinical experiences which they could relate to the theory, they were able to grasp the concepts, remember them, and apply them better in other situations.

Clinical scores strongly correlated for only the second and third rotations in the winter course. The first rotation had the lowest relationship to other rotations. Perhaps the students became adjusted towards situations in the first rotation, and similar content was being emphasized to all groups regardless of the clinical setting. This first clinical experience was also the students' first contact with patients in an acute care setting and possibly they had to adjust. This situation may have taken away from their ability to utilize new information and skills. Perhaps we need to take this into account in defining expectations in the first clinical experience. The students may require additional exposure to that type of client situation at a later date.

The low correlation with other rotations seems difficult to explain. It may be due to the fact that although similarities certainly exist in

all clinical settings, students must apply new information to the types of clients and their difficulties, and must adapt to using skills in new situations. Some students may be more adaptable and be able to become oriented quickly to a new area, whereas other students are slower. Some students also are slow developers or "late bloomers." These students may not do as well in the earlier part of the year but are able to pick up quickly when things start to fall into place. Other students are able to cope when the expectations are less. But as the year goes on and the expectations increase, they have greater and greater difficulty coping with the added responsibilities, clinical judgements, depth of care, and other nursing and team responsibilities.

The sequence of rotations showed no significant differences in scores of persons undergoing the rotation. One pattern, (Pediatrics, Medicine, Surgery and Psychiatry) did reveal higher clinical-theoretical relationships. The lowest clinical-theoretical relationship was Psychiatry, Pediatrics, Medicine, and Surgery. The class content relating more specifically to Psychiatry and the care of patients with emotional difficulties is not scheduled in the fall term. This left students having their clinical rotation in Psychiatry first at some disadvantage, although they became familiar with considerable content from instructors while in the field. The Medical-Surgical class content is scheduled throughout the year because that is where the majority of the students are having their clinical experience. Integration is attempted but this is still a difficulty.

A powerful correlation existed between the scores on the NLN and RN examinations, although the NLN scores were higher. Higher correlation was found between these tests and the winter nursing course scores than the summer course scores. A different emphasis in course content may be reflected in these values. In the summer, emphasis is given to consolidation of material and greater depth of care together with leadership principles, and the leadership component is not tested in the outside examinations.

Strong correlation between NLN and RN scores may indicate some potential usefulness of the NLN Achievement Tests in providing some guidance to students who are preparing for the RN examinations. The NLN test results could be used for student feedback and a basis for student assistance.

The relationship is also positive when we look at specific clinical areas and success in NLN and RN scores. The Medical and Pediatric correlations each seemed quite good. The Surgical rotation proved a stronger indicator when students took it later in the year, and this

might be explained by the more general nature of the surgical experience at an earlier time in the year. No relationship between Pediatrics and Psychiatry to their RN and NLN scores was found.

Summary

A study was done to determine the interrelationships among theory course grades, clinical practice grades, sequence of rotations, NLN Achievement Tests and RN examinations of second-year nursing students at the University of British Columbia. It was concluded that both classroom examinations and clinical evaluations were good indicators of course success, and success in NLN and RN examinations. However, the relationship between clinical and theory was weak. The sequence pattern of rotations seemed to have some influence on the relationship.

The results support the null hypothesis that there is no relationship between examinations and clinical practice, and suggest a need for a wide variety of testing procedures in order to get a full picture of the students' abilities related to nursing. Research in nursing education could emphasize multiple measure of students' ability or learning. The results also suggest that students who do well in one area may not necessarily do well in other clinical areas.

The results of the study are reflective of one class of students in one nursing school and results cannot be generalized beyond that population.

¹ The U.B.C. program incorporates the ladder concept in its two plus two program. The first two years are eleven months long with one month off in August. It is incumbent upon the instructors to prepare the students to be R.N.'s at the end of the second year.

First year courses:

September - April: Nursing the Well Person, Human Behavioural Science, English, Zoology, Microbiology.

May - July: Maturational Problems of the Well Person (clinical experience in Obstetrical and Extended Care areas)

Second year courses:

September - April: The Person with Problems Related to Loss, Pathology, Anthropology or Sociology, free elective (3 clinical placements - 12 hours/week)

May - August: The Person with Problems Related to Loss (3 clinical placements - 24 hours/week)

² Sequence patterns with the numbers of students in each in brackets [].

1. Medicine, Surgery, Psychiatry, Pediatrics [27]
2. Medicine, Surgery, Pediatrics, Psychiatry [7]
3. Pediatrics, Medicine, Surgery, Psychiatry [20]
4. Surgery, Pediatrics, Medicine, Surgery [6]
5. Psychiatry, Pediatrics, Medicine, Surgery [20]
6. Surgery, Psychiatry, Pediatrics, Medicine [20]

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RESUME

RELATIONS ENTRE LA THEORIE ENSEIGNEE EN CLASSE ET LA PRATIQUE CLINIQUE

Cette communication fait état des résultats d'une étude visant à déterminer les relations entre les notes obtenues aux cours théoriques, celles obtenues pour les travaux cliniques, la séquence des stages, les résultats des tests NLN (NLN Achievement Test) et ceux des examens de sciences infirmières des étudiantes de deuxième année (programme universitaire). On a conclu que les examens en classe et les évaluations cliniques étaient tous deux de bons indicateurs de succès au cours et aux examens de sciences infirmières ainsi qu'au test NLN. Toutefois le rapport entre la clinique et la théorie est apparu faible. Il semble que la séquence des stages ait quelque influence sur cette relation. Les résultats semblent également indiquer que les étudiants qui réussissent dans un domaine n'auront pas nécessairement les mêmes succès dans d'autres domaines cliniques. Les résultats de l'étude reflètent les observations d'une classe d'étudiants effectuées dans une seule école de sciences infirmières et on ne peut les généraliser au-delà de la population étudiée.

Thank you for the Contribution to Nursing Papers

Nursing Papers gratefully acknowledges the contribution of the Canadian Association of University Schools of Nursing (CAUSN) for \$4,000.00 for the year 1980.

Merci de votre contribution financière à Perspective en nursing

Le comité de rédaction de Perspectives en nursing tient à exprimer sa reconnaissance à l'Association canadienne des Ecoles universitaires de nursing (ACEUN), à Ottawa, pour l'aide financière accrue fournie en 1980 de \$4,000.00.