



Revista da Escola de Enfermagem da USP

ISSN: 0080-6234

reeusp@usp.br

Universidade de São Paulo

Brasil

Demandes, Ingrid; Latrach, Cecilia A.; Pamela Febre, Naldy; Muñoz, Claudia; Torres, Pamela;  
Retamal, Jessica

Evaluación del razonamiento científico y comunicación oral y escrita en el licenciado en enfermería

Revista da Escola de Enfermagem da USP, vol. 46, núm. 4, agosto, 2012, pp. 980-984

Universidade de São Paulo

São Paulo, Brasil

Disponível em: <http://www.redalyc.org/articulo.oa?id=361033319028>

- Como citar este artigo
- Número completo
- Mais artigos
- Home da revista no Redalyc

redalyc.org

Sistema de Informação Científica

Rede de Revistas Científicas da América Latina, Caribe, Espanha e Portugal

Projeto acadêmico sem fins lucrativos desenvolvido no âmbito da iniciativa Acesso Aberto

# The evaluation of nursing graduates' scientific reasoning and oral and written communication

AVALIAÇÃO DO RACIOCÍNIO CIENTÍFICO E COMUNICAÇÃO ORAL E ESCRITA NO GRADUADO EM ENFERMAGEM

THE EVALUATION OF NURSING GRADUATES' SCIENTIFIC REASONING AND ORAL AND WRITTEN COMMUNICATION

Ingrid Demandes<sup>1</sup>, Cecilia A. Latrach<sup>2</sup>, Naldy Pamela Febre<sup>3</sup>, Claudia Muñoz<sup>4</sup>, Pamela Torres<sup>5</sup>, Jessica Retamal<sup>6</sup>

## ABSTRACT

This descriptive, cross-sectional study was performed in Santiago de Chile, with the objective to evaluate the scientific reasoning and the oral and written communication of nursing graduates. The sample consisted of 37 nursing graduates who participated in the three stages of the study: I) creation and validation of the instrument; II) training the faculty participating in the study to apply the instrument uniformly; and III) application of the instrument and data analysis. The data show different percentages regarding this competency, with the predominance of scientific reasoning (83.16%), followed by oral and written communication (78.37%). In conclusion, this study demonstrates the value for nursing schools to implement a formal evaluation that allows for determining the profile of nursing graduates, guaranteeing the quality of their training and education.

## DESCRIPTORS

Education, nursing  
Students, nursing  
Communication

## RESUMO

O presente trabalho trata-se de estudo descritivo e transversal realizado em Santiago do Chile, que teve como objetivo de avaliar o raciocínio científico e a comunicação oral e escrita dos estudantes graduados em enfermagem. A amostra foi constituída por 37 estudantes graduados enfermagem que participaram da pesquisa concebida em três etapas: I) criação e validação do instrumento; II) formação dos professores participantes da equipe para aplicação uniforme do instrumento; III) aplicação do instrumento e análise de dados. Os dados mostram diferentes porcentagens desta competência, predominando o raciocínio científico (83,16%), seguido de comunicação oral e escrita (78,37%). Conclui-se que esta pesquisa demonstra a utilidade para as escolas de enfermagem da implementação de uma avaliação formal que permita determinar o perfil de egresso do graduado em enfermagem garantindo a qualidade da formação.

## DESCRIPTORES

Educação em enfermagem  
Estudantes de enfermagem  
Comunicação

## RESUMEN

Estudio descriptivo, transversal, realizado en Santiago de Chile. Tuvo como objetivo evaluar el razonamiento científico y comunicación oral y escrita en el licenciado en enfermería. Muestra constituida por 37 estudiantes licenciados en la carrera de enfermería. La investigación fue diseñada en tres etapas: I) creación y validación del instrumento; II) capacitación del equipo de docentes participantes para la aplicación uniforme del instrumento; III) aplicación del instrumento y análisis de datos. Los principales resultados muestran porcentajes diferentes de competencia obtenidos por los licenciados en enfermería, prevaleciendo el logro del razonamiento científico (83,16%); seguido de la comunicación oral y escrita (78,37%). Esta investigación muestra la utilidad para las Escuelas de Enfermería de implementar un sistema para evaluar el perfil de egresados del grado de licenciado en enfermería que garantice la calidad de la formación.

## DESCRIPTORES

Educación en enfermería  
Estudiantes de enfermería  
Comunicación

<sup>1</sup>RN. M.Sc. in Nursing. Faculty at Universidad Mayor School of Nursing. Santiago, Chile. [ingrid.demandes@umayor.cl](mailto:ingrid.demandes@umayor.cl) <sup>2</sup>RN. M.Sc. in University Education. Dean, Universidad Mayor School of Nursing. Santiago, Chile. [cecilia.latrach@umayor.cl](mailto:cecilia.latrach@umayor.cl) <sup>3</sup>RN. Ph.D. in Health Sciences/Hospital Epidemiology. Faculty at Universidad Mayor School of Nursing. Santiago, Chile. [nfebre@vtr.net](mailto:nfebre@vtr.net) <sup>4</sup>RN. M.Sc. in University Education. Faculty at Universidad Mayor School of Nursing. [claudia.munoz@umayor.cl](mailto:claudia.munoz@umayor.cl) <sup>5</sup>RN. M.Sc. in University Education. Faculty at Universidad Mayor School of Nursing. Santiago, Chile. [pamela.torres@umayor.cl](mailto:pamela.torres@umayor.cl) <sup>6</sup>RN. M.Sc. in University Education. Faculty at Universidad Mayor School of Nursing. Santiago, Chile. [jessica.retamal@umayor.cl](mailto:jessica.retamal@umayor.cl)

## INTRODUCTION

The term reasoning is defined in scientific literature as

the thinking activity through which a chain of judgments is developed to establish the truth or falseness of something, it is a rational process of argumentation or justification of a hypothesis, this reasoning can be deductive and inductive. The former is a logical structure in the form of a syllogism, while inductive reasoning permits generalizations based on the observation of regularities when evaluating particular events and establishing relations among them<sup>(1)</sup>.

Students' scientific reasoning and preliminary knowledge are acknowledged today as fundamental pillars for learning at higher education level<sup>(2)</sup>. It is a skill that implies how to learn, and enhances students' ability between scientific and non-scientific evidence<sup>(3)</sup>.

Scientific reasoning is defined as a strict deduction process, which excludes imagination and intuitive thinking in the field of knowledge and considers *per se* an observation, experience and analysis method, together with the construction of hypotheses and their subsequent verification, conceptualized as a common process for different sciences<sup>(4)</sup>.

The scientific research process combines scientific reasoning with oral and written communication skills, which are universal processes in science and, therefore, common goals in the elaboration of higher education curricula<sup>(5)</sup>. Nursing literature acknowledges that graduates' competences should include the recognition of the research phases, collaboration with data collection, application of research results in practice and knowledge about the ethical principles of scientific integrity<sup>(6-7)</sup>.

The assessment of both oral and written communication skills is defined as the ability to structure and organize ideas, transmit them clearly, administer information, decide on what data to present in function of the proposed objectives, analyze arguments that sustain these ideas, adapting oral and written discourse to distinct audiences<sup>(8)</sup>.

Different studies have assessed students' scientific reasoning, using a range of methods to evaluate the research process students receive and verbal and written communication<sup>(9-12)</sup>.

Today, Chilean universities are development curricular renovation processes, in line with international standards. Due to this situation, this university has put in practice and developed three education levels for undergraduate students: 1) Bachelor; 2) Degree and 3) Professional. It is highlighted that, in the profile of nursing graduates, the nursing school where this study was carried out defined research competency as:

The scientific research process combines scientific reasoning with oral and written communication skills, which are universal processes in science and, therefore, common goals in the elaboration of higher education curricula.

that student capable of using scientific reasoning as a fundamental tool in the analysis of problems in the disciplinary context and capable of communicating his/her proposals in the oral and written form clear and coherently.

The aim of this research is to assess how students with a nursing degree perform concerning this competence.

## OBJECTIVE

To assess scientific reasoning and oral and written communication in nursing graduates.

## METHOD

This quantitative, descriptive and cross-sectional study was developed at the School of Nursing of a private university in Santiago de Chile in 2009. The universe and sample consisted of 37 fourth-year students in the nursing degree program at the same institution, with each student representing the analysis unit in this research.

This research was designed in three phases: I) creation and validation of the instrument; II) training of the participating faculty team with a view to the uniform application of the instrument; III) application of the instrument and data analysis.

In phase one, to design the data collection instrument, the graduate profile was analyzed, the functional map of the course, considering both its main goal and key functions, with a view to defining the degree program student profile. Considering the above antecedents and based on literature recommendations<sup>(6-7)</sup>, the evaluation matrix was developed, in which the following selected competency was described: *To use scientific reasoning as a fundamental tool to analyze problems in the disciplinary context and being capable of communicating one's proposals clear and coherently in the oral and written form*, the evaluation situation was defined and, in view of these antecedents, a matrix was elaborated, called *Matrix for the analysis of a research paper*, including 18 skills that were categorized dichotomously as competent performance and inapt performance. It is highlighted that the first 13 skills served to assess scientific reasoning (Table 2) and the remaining five to assess oral and written communication (Table 3). Each skill was scored according to the degree of complexity. The ideal score was considered as 35 points. The cut-off point was set at 24.5. Thus, students were considered *competent* if they scored 24.5 or more, equivalent to 70 percent of success. It is highlighted that, for competent performance, the assigned score varied from one to five points, depending on the evaluated category. Zero points were assigned when the student was not competent. For the sake of validation, the expert validation method was

used (Nursing Professionals, faculty members with a Master's degree in University Education) and the application method to a small representative sample.

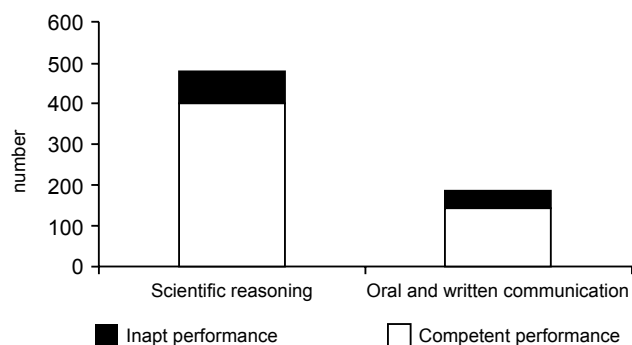
In the second phase, experts were selected among the academic staff of the School of Nursing, excluding faculty members who had participated in the instrument design or validation phase. In total, five faculty members participated in this second phase.

In the third phase, 37 fourth-year nursing students were selected, who received a nursing research paper the research team had selected, a written instruction sheet, the matrix and blank sheets for written notes. The students were distributed across a reserved room with two supervising faculty members to develop the analysis of the paper and written notes. At the end of this phase, the students were redistributed individually to one of the five evaluating faculty members, accompanied by their respective attester, for a ten-minute oral presentation, with six or seven students per evaluator.

SPSS 15.0 was used for statistic data processing, applying descriptive statistics. Internationally established ethical guidelines were complied with through the participants' informed consent and approval by the institution's ethics committee.

## RESULTS

In this research, in total, 37 fourth-year nursing students were evaluated, representing 100% of the convenience sample. Out of 18 skills assessed in the matrix, the first 13 served to assess scientific reasoning. Thus, based on 481 evaluations in the selected sample, in 83.16% (400/481 observations), students were ranked as competent. Also, 185 evaluations were performed to define compliance (competent or inapt) with the five skills aimed at determining the sample's oral and written communication competency. The competent category corresponded to 78.37% of the evaluations (145/185 observations), data shown in Figure 1.



**Figure 1** – Percentage distribution of number of evaluations according to compliance with skills to determine scientific reasoning and oral-written communication competences - Santiago, Chile, 2009

The students' percentage distribution according to their performance of the graduate level competence is observed in Table 1, showing that 92% of the 337 evaluated students achieves the selected competence at the end of the degree program.

**Table 1** – Percentage distribution of students according to performance of competency *using scientific reasoning* in the degree program. Santiago, Chile - 2009.

Global performance on the competency*	Number	Percentage
Competent performance	34	92.00
Inapt performance	03	8.00
<b>Total</b>	<b>37</b>	<b>100.00</b>

\*Using scientific reasoning as a fundamental tool in problem analysis in the disciplinary context and being capable of communicating one's proposals clear and coherently in the oral and written form.

n=37 students

In Table 2, the numerical and percentage distribution results are displayed for the students' performance, according to the identification of the skills defined to determine performance concerning the application of scientific reasoning. Ninety-two percent or more of the students were competent in the following skills: *identifies the aim of the paper; identifies the research universe; specifies the result analysis; mentions the study variables and determines the study type and design*. It is noteworthy that 19 students were competent in *deduces the purpose of the paper*, representing 51%.

**Table 2** – Numerical and percentage distribution of students' competent performance according to the identification of the elements assessed in the use of scientific reasoning - Santiago, Chile -2009

Skill assessed	Competent performance	
	Number	Percentage
Deduces the purpose of the paper	19	51
Identifies the aims of the paper	36	97
Identifies essential information quotes	31	84
Mentions the study variables	34	92
Determines study type and design	34	92
Indicates the study universe	27	73
Identifies the study sample	35	95
Specifies the data collection method used	29	78
Specifies ethical aspects	32	86
Specifies result analysis	34	92
Recognizes study conclusions	25	68
Recognizes implications of the paper's scope and relates them with aspects of the discipline	32	84
Reflects on the paper and establishes links with aspects of the nursing discipline	32	86

n=37

The data presented in Table 3 show the percentage distribution of students' *competent performance* on oral and written communication skills. It is highlighted that 95% of the 37 students assessed achieve *competent performance on written presentation skills*, while 68% were ranked as competent on *use of the vocal dialect*.

**Table 3** – Percentage distribution of students' *competent performance* according to effective communication skills - Santiago, Chile - 2009

Skill assessed	Competent performance	
	Number	Percentage
Oral presentation	31	84.00
Use of vocal dialect	25	68.00
Use of visual element	27	73.00
Attention from auditorium	27	73.00
Written presentation	30	96.00

n=31

## DISCUSSION

The scientific research process combines scientific reasoning with oral and written communication skills<sup>(13)</sup>. Nursing graduates should recognize the steps of the research process and apply them to their professional know-how, respecting the ethical principles of scientific integrity<sup>(6-7)</sup>. That is why this paper is of interest to nursing colleges, as it discusses the assessment scientific reasoning together with oral and written communication in nursing graduates.

The results obtained in this research show that, in 83.16% of the observations, the students were considered competent in their application of scientific reasoning, differing from a descriptive, cross-sectional study from 2005, in which the research competences required for nursing professionals' different education levels were identified. For the degree program level, the scores obtained on 73.0% of the competences suggest that these are appropriate but not essential<sup>(7)</sup>. These results are not comparable, mainly due to the methods used, highlighting that the present research was aimed at assessing students' direct skills, while the second focused on the perceived important faculty members assigned to research competences.

The collected data show that, for oral and written communication skills, the nursing graduates were competent in 78.37%. In addition, data from Venezuela show that college students considered oral and written communication less important<sup>(10)</sup>. This differs from what nursing professionals documented, who defined knowing how to communicate as *understanding, processing, transmitting information and knowledge, guaranteeing other people's understanding*<sup>(14)</sup>. The above reaffirms the need to create educative tools that make it easier for students to achieve oral and written communication competences, a relevant condition in professional know-how, as educative processes aim to move from a state of relative ignorance to a state of knowledge, capable of transforming reality<sup>(15)</sup>.

Through 13 scientific reasoning skills (Table 2), in this research, skills were assessed that are aimed at valuating the steps of the scientific method in students and their ability to analyze the paper's implications for nursing. It is highlighted that 92.0% of the students achieved what is considered competent performance, differently from

a study in Peru, which found that the knowledge level of fourth-year medical students on research methods equaled 56.0%, emphasizing that this level increases to 78.0%, when the evaluated students belong to a research group in their college of origin<sup>(16)</sup>.

The identification and explanation of elements present in a study, together with the analysis of a scientific paper's implications in professional practice, are essential elements for degree program graduates<sup>(7)</sup>. More than 80.0% of the study sample achieved these skills. Nevertheless, it was demonstrated that the research design represents greater difficulties for students to develop a research<sup>(16)</sup>.

The obtained results on oral and written communication skills (Table 3) show that 95.0% achieved this competent performance for *written presentation*. On the other hand, the skills *use of the vocal dialect* was ranked as competent in 68% of participants. A study that complements these results involved college students, showing that the utility level students assigned to oral and written communication-related skills represented 32.65%, 28.57%, 23.47% and 15.31% for writing, elaborating reports, elaborating and writing out written papers and preparation of presentations, respectively<sup>(10)</sup>.

## CONCLUSION

In conclusion, in the light of the data, the nursing students achieved the assessed competency *Using scientific reasoning as a fundamental tool in problem analysis in the disciplinary context and being capable of communicating one's proposals clear and coherently in the oral and written form* to different extents, with higher percentages for scientific reasoning (83.16%), followed by oral and written communication (78.3%), which showed at least one skill in each area with lower compliance percentages (*deduces the purpose of the paper; use of the vocal dialect*). Evaluations and adequate interventions in this situation are needed through the evaluation of what subjects contribute to the achievement of this competency, with a view to designing teaching-learning strategies that allow students to develop skills to gain these skills. Moreover, the researchers propose, besides the assessment of this competency, the search for scientific evidence, with a view to reinforcing future graduates' organized and systematic scientific reasoning, so as to contribute to prepare autonomous and reflexive professionals, who are capable of coping with situations, who involve a personal criterion for analytic and critical problem solving, and to proactively seek information to enhance knowledge management and information technology.

This research showed the utility of setting up a system to assess and certify scientific reasoning in degree program graduates for Nursing colleges, thus guaranteeing the quality of education.

## REFERENCES

1. Japiassú H, Marcondes D. Dicionário básico de filosofia. São Paulo: Jorge Zahar; 2008.
2. Coletta VP, Phillips JA. Interpreting FCI scores: normalized gain, preinstruction scores, and scientific reasoning ability. *Am J Physics*. 2005;73(12):1172-82.
3. McDemontt LC, Shaffer PS. Tutoriales para física introductoria. Washington: Departamento de Física, Universidad de Washington; 2001
4. Ruiz R. El método científico y sus etapas. Biblioteca Lascazas [Internet]. 2007 [citado 2010 jul. 19];3(3). Disponible en: <http://www.index-f.com/lascasas/documentos/lc0256.php>
5. Timmerman B. Peer review in an undergraduate biology curriculum: effects on students' scientific reasoning, writing and attitudes [Internet]. Sydney: Curtin University of Technology; 2008 [cited 2010 July 19]. Available from: [http://espace.library.curtin.edu.au/R/?func=dbin-jump-full&object\\_id=18880&local\\_base=GEN01-ERA02](http://espace.library.curtin.edu.au/R/?func=dbin-jump-full&object_id=18880&local_base=GEN01-ERA02)
6. American Association of Colleges of Nursing. Position statement on nursing research [Internet]. Washington; 1999 [cited 2010 July 19]. Available from: <http://www.aacn.nche.edu/publications/position/nursing-research>
7. Harrison L, Ray H, Cianelli R, Rivera M, Urrutia M. Competencia en investigación para diferentes niveles de formación de enfermeras: una perspectiva latinoamericana. *Ciênc Enferm*. 2005;11(1):59-71.
8. Alarcón Opazo H, De La Garza Becerra JE. Influencia del razonamiento científico en el aprendizaje de conceptos en física universitaria: comparación entre instrucción tradicional e instrucción por modelación [Internet]. [citado 2010 jun. 10]. Disponible en: [http://www.comie.org.mx/congreso/memoria/v10/pdf/area\\_tematica\\_05/ponencias/1189-F.pdf](http://www.comie.org.mx/congreso/memoria/v10/pdf/area_tematica_05/ponencias/1189-F.pdf)
9. Norman IJ, Watson R, Murrells T, Calman L, Redfern S. The validity and reliability of methods to assess the competence to practise of pre-registration nursing and midwifery students. *Int J Nurs Stud*. 2002;39(2):133-45.
10. Del Rosario Torres M. Análisis y validación de las estrategias metodológicas y de evaluación aplicadas en la cátedra lenguaje y comunicación en los períodos lectivos 1999-2001: una experiencia creativa. *Educere*. 2006;10(34):511-7.
11. García de Cajén S, Domínguez CJ, García Rodeja FE. Razonamiento y argumentación en ciencias, diferentes puntos de vista en el currículo oficial. *Enseñan Cienc*. 2002;20(2):217-28
12. Guissasola J, Ceberio M, Zubimendi J. El papel científico de la hipótesis y los razonamientos de los estudiantes universitarios en resolución de problemas de física. *Invest Ensino Ciênc*. 2003;8(3):211-29.
13. Dávila Newman G. El razonamiento inductivo y deductivo dentro de proceso investigativo en ciencias experimentales y sociales. *Laurus Rev Educ* [Internet]. 2006 [citado 2010 jul. 19];12:180-205. Disponible en: <http://redalyc.uaemex.mx/pdf/761/76109911.pdf>
14. Peres AM, Ciampone MT. Gerência e competências gerais do enfermeiro. *Texto Contexto Enferm*. 2006;15(3):492-9.
15. Ito EE, Peres AM, Takahashi RT, Leite MM. O ensino de enfermagem e as diretrizes curriculares nacionais: utopia x realidade. *Rev Esc Enferm USP*. 2006;40(4):570-5.
16. Díaz VC, Manrique GL, Galán RE, Apolaya SM. Conocimientos, actitudes y prácticas en investigación de los estudiantes de pregrado de facultades de medicina del Perú. *Acta Med Per*. 2008;25(1):9-15.