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Association of professional training evaluation to content evaluation

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Abstract

Problem-based learning (PBL) is the main strategy used on the curriculum of the University of Girona's medical degree program, comprising more than 60% of each educational module. It focuses not only on evaluating medical knowledge and skills, but also on appraisal of students' learning and teamwork abilities, communication skills and sense of responsibility, that is, professional values and attitudes, often referred to as professionalism. The aim of this study is to analyze the association between professional training evaluation and content evaluation results in the Medical Emergencies Module. PBL based professional values evaluation was conducted following an assessment questionnaire. Five tutors facilitated and conducted these evaluations in 11 different PBL groups with 7 to 10 students each. Content evaluation was carried out by content tests based on problem solving. In order to analyze correlation between the two variables, a Spearman correlation coefficient was calculated. A total of 106 student evaluations were performed, 56 in 2010 and 50 in 2011, within the Medical Emergencies module. Spearman correlation coefficient was 0.42. Rho value was higher in 2010 (Rho = 0.5) than in 2011 period (Rho = 0.39). Results were statistically significant in all analyses performed (p-value < 0.001) and showed that professional training evaluation is weakly associated with content evaluation.

*Keywords:*Problem-based learning; evaluation; professional trining.

1. Introduction

Medical schools worldwide aim to produce competent physicians able to serve the community and advance the field of medicine (Alwan et al, 2011). Training should prepare medical students to deal with problems they will face in the future and equip them with the necessary skills to become active, self-directed learners, rather than passive recipients of information (Dolmans & Schmidt, 2006). Competence is acquired through the development and integration of the cognitive, psychomotor and affective domains (Bloom, 1956), and a well-designed curriculum should ensure students achieve this. On the other hand, professionalism has been described as a set of values and behaviors that underpin the social contract between patients and health care professionals. Several studies seem to confirm the existence of reasonably high rates of error in the healthcare system, most of them related to failure of professionalism, in contrast to those resulting from inadequacies of knowledge (Wilson et al., 1999). Even though reasons for medical error seem to be multiple, inter-related and complex, students with well developed professional values will have greater capacity to learn from the error, modify their behavior or develop an approach to reduce the

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likelihood of medical error occurring in their future practice (O'Sullivan & Toohey, 2008). Promoting professionalism might even be considered the most important aspect of medical training (Tiffin et al., 2011).

Within the discipline of medical training, problem-based learning (PBL) is a curricular approach that focuses on student-centered education. The pedagogical appeal of PBL is its perceived capacity to encourage, via these learning processes, enhanced clinical reasoning skills, and the development of both an adaptable knowledge base and skills in self-directed learning necessary to become lifelong learners (Kelson & Distlehorst, 2000). Four conditions crucial to learning are encompassed within the PBL approach: a well-structured knowledge base, active learning, collaborative learner interaction and a context designed to promote internal motivation through the provision of pragmatic goals (Margetson, 1994). PBL is an educational approach that challenges students to 'learn to learn' and work co-operatively in groups to seek solutions (Haghparast et al., 2007).

PBL is the basic learning strategy used on the University of Girona's medical program, comprising more than 60% of each educational module. It focuses not only on evaluating medical knowledge and skills, but also on appraisal of students' learning and teamwork abilities, communication skills and sense of responsibility, that is, professional values and attitudes, often referred to as professionalism. Of course, in addition to acquiring professional values and attitudes, medical knowledge and clinical skills are major criteria for being a competent physician. It seems obvious then that medical training should ensure that students acquire both content knowledge and professional values and attitudes. The aim of this study is to analyze the association between professional training evaluation and content evaluation results in the Medical Emergencies Module.

2. Methods

2.1. Professional values and attitudes evaluation

Professional values and attitudes evaluation was conducted by administering a standardized questionnaire within the final PBL session of the Medical Emergencies Module. Five tutors facilitated and conducted these evaluations in 11 different PBL groups with 7 to 10 students each. The standardized questionnaire was based on a previously designed instrument (*Vecchi C., et al., 2004*) and its subsequent adaptation by one of the authors (*Branda L., 2009*), currently working in our organization.

Twenty items encompassing different values and attitudes are clustered around four different dimensions: *learning abilities, responsibility, communication and interpersonal relationships*. The *Learning abilities* dimension includes different criteria such as: identifying areas of learning, applying prior knowledge, contributing to the group study plan, critical analysis, and contributing to the learning of the group. *Responsibility* includes criteria related to individual students' attendance and punctuality in PBL sessions, searching for knowledge the group has identified as their responsibility, ability to demonstrate comprehension of areas of knowledge, and ability to undertake actions to improve weaknesses. *Communication* refers to oral expression, ability to make comments to clarify ideas, participation and ability to make relevant comments and summarize information. Finally, *interpersonal relationships* involves respect, cooperative and collaborative behavior, contribution to organizing discussion, and ability to give and receive criticism in a constructive manner.

Evaluations from the various PBL sessions will account for 40% of the Medical Emergencies Module evaluation. Each of the four above mentioned dimensions has a 25% grade proportion and the score range is 0 – 10.

2.2. Content evaluation

Content evaluation was carried out by content tests based on problem solving. It is designed with the aim of providing the student with an opportunity to work in an independent manner and to demonstrate comprehension of the knowledge that is relevant to the learning objectives of the Module and to the situation or problem itself. The exam consists of three stages:

Stage I: From the statement of the situation or problem, the student should identify four different topics that are relevant to both the learning objectives of the Module and to the present situation or problem. Based on previous knowledge, for each topic, the student writes a brief explanation to justify his or her choice. From the four chosen topics the student selects two which will form the basis of his/her study plan; the selection of topics should be based on their importance in contributing to a better understanding of the situation or problem.

Stage II: Individual study period. During the assigned individual study period the student is to search for information and study the two topics chosen in Part 1 of this test. He or she can consult whichever learning resources that are considered useful, including books, journal articles, experts in the knowledge areas and classmates.

Stage III. In this part of the evaluation, the student develops the two topics identified in his or her study plan, in the context of the questions provided. The questions are oriented towards the development of comprehension, of the capability to establish correlations, of analysis and synthesis, and towards the accreditation of acquired knowledge.

This evaluation will account for 60% of the Medical Emergencies Module evaluation. When evaluating written exercises several aspects are considered: relevance to the learning objectives and to the situation of the chosen topics, accreditation of knowledge acquired within the question context and readability and conciseness. Each topic is evaluated by a different tutor, a person with considerable expertise in the field, thus ensuring that the tutor who evaluated PBL professional values is different from the one evaluating content related to the chosen topics.

2.3. Statistical analysis

The mean and standard deviation of the two variables were determined for the whole group studied and also stratified by the academic years 2010 and 2011. In order to analyze the correlation between PBL based professional values and content evaluation, the Spearman correlation coefficient (SCC) was calculated. Concordance analysis was performed using the intraclass correlation coefficient (ICC) between the values of PBL based professional values and content evaluation for the same student. Also, SCC and ICC were determined for the whole sample and stratified by academic years. The statistical analysis of the data was performed with the program SPSS version 15.0 for Windows. Results were considered statistically significant when $P<0.001$.

3. Results

Table 1 shows basic statistical results (mean and SD) of PBL based professional values and content evaluation in the whole group studied, including those referred to 2010 and 2011 academic years. As shown in Figure1a, a weak direct and statistically significant correlation was observed between PBL based professional values and content evaluation in the whole group studied ($n = 106$): with an ICC of 0.50 (confidence interval [CI] 95%, (0.215 – 0.676) and a SCC of $r = 0.42$ ($P<0.001$) (Table 2). After stratifying by academic years (2010 and 2011), the correlation between PBL based professional values and content evaluation was higher in 2010 (Rho = 0.5) than in 2011 (Rho = 0.39). Results were statistically significant in all the analyses performed (p-value < 0.001) (Table 2).

Table 1. Basic statistical results referred to professional values evaluation and content evaluation for the whole sample, and by academic year.

	Professional values and attitudes evaluation			Content Evaluation		
	Total	2010	2011	Total	2010	2011
N	95	45	50	106	56	50
Mean	8.03	7.95	8.10	7.43	7.47	7.39
Median	8.75	8.75	8.25	7.55	7.58	7.35
SD	1.58	1.74	1.45	1.01	0.95	1.09
Minimum value	3.00	3.00	3.00	5.30	5.30	5.30
Maximum value	10.00	10.00	10.00	9.65	9.00	9.65

SD: Standard Deviation

Table 2. Intraclass correlation coefficient and Spearman correlation coefficient between the values of professional values evaluation and content evaluation

	All	2010	2011
n	106	95	106
ICC	0.50	0.53	0.48
(CI 95%)	(0.22 – 0.68)	(0.15 – 0.74)	(0.06 – 0.71)
SCC (r)	0.42	0.5	0.39
P	<0.001	<0.001	<0.001

ICC: Intraclass correlation coefficient; SCC: Spearman correlation coefficient; CI: confidence interval; n: sample

4. Discussion and conclusions

The new medical education approach employing problem based learning is somehow not fully accepted by more traditionally oriented teachers of medicine. Certain aspects could be seen as underdeveloped in medical students, when their training is more focused on professionalism. Content knowledge of students seems to be one of the aspects under discussion. Our research shows that professional training evaluation, although weakly, is associated with content evaluation. This result seems to suggest that those students with better-developed professionalism may also have a higher level of theoretical medical knowledge, measured in terms of their exam scores.

However, a number of limitations of this finding need to be considered. Our results are based on the analysis of a specific module using a relatively small sample. Further research should be done with a larger sample and with other modules of the medical degree curriculum in order to confirm the association between professional training and content knowledge.

5. Aknowledgements

6. References

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