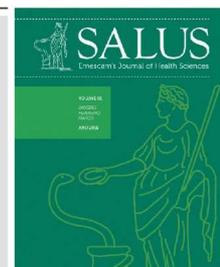




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ORIGINAL ARTICLE

The validation of a questionnaire used to capture the perception of technical scientific knowledge on healthcare education

Mattede MGS¹ e Centurión D²

¹ PhD, Professor, EMESCAM College of Health Sciences, Vitoria-ES, Brazil

² PhD, Professor, Universidad Autónoma de Asunción - UAA, Asuncion, Paraguay

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Abstract

Objective: Developing and validating a questionnaire on health knowledge.

Method: Descriptive, cross-sectional, quantitative design with closed questions about health education divided into five dimensions with ten indicators, thus making 50 items in Likert scale from 5.0 to 1.0. Alpha Cronbach coefficient, Pearson correlation coefficient and the statistical software SPSS 17.0 PASW Statistics version 20.0 IBM 1989, 2011 were used for calculating the reliability and the internal consistency of the constructs.

Result: There was statistically significant correlation ($p < 0.05$) in the one hundred applied questionnaires. There was emphasis on the indicators of skills and general skills required for graduates' profile: in Pharmacy, 47% of the students do not meet the profile; in Medical school, 52% did not meet the. There is 50% mismatching with articulated knowledge in the Pharmacy course and it was of 34% in the Medical School. Of the total of Pharmacy students, 82% did not meet hospital learning knowledge; among medical students, 63% fulfilled this requirement.

Conclusion: The questionnaire allows viewing the teaching-learning process according to the real world and it offers reliability and reproducibility with internal consistency.

Corresponding author.

E-mail: graca_@hotmail.com

Introduction

The questionnaire concerning technical and scientific knowledge is an elaborated tool, which aims to measure skills and competencies acquired in healthcare undergraduate courses. The World Health Organization (WHO) and the Pan American Health Organization (PAHO) have shown concerns regarding the professional training model. Both organizations understand that such training should be guided according to the education pillars of the 21st century. Thus, students go from the mere condition of knowledge accumulators to that of individuals capable of being continuously updated by furthering on the acquired reflective thinking in order to improve their creative potential to learn how to learn, to live together, to be and to do.¹

Thus, it is worth finding a way to assess whether these competencies and skills are acquired throughout academic life. Such competencies and skills demand a generalist, humanist, critical and reflective profile.²⁻⁴

Therefore, the present study aims to develop and validate a questionnaire used to analyze these skills and abilities by highlighting the desired profile, the knowledge areas as well as the learning to learn, how to live together, to be and to know how to do processes, in addition to the educational strategies used in the herein applied content.¹

The instrument uses a content model called Medical Mycology to provide the scope of the used model in other health courses.

The behavioral or cognitive educational content intensely interacts with education theories and it depends on social, political, cultural and economic factors.⁵ Whenever the "learn how to learn" process is contextualized, it is noticeable that teaching does not mean transferring knowledge, but creating possibilities for self-production or self-construction.⁶ Surveys from studies in this field reveal that knowledge construction meets learning in public policies related to social development and it seeks instruments to measure learning evidences.^{7,8} The social

and cultural contexts can discuss the learning process in the healthcare field by applying a questionnaire whose content prioritizes the evidence that education in the community is based on real conditions which legitimize causes arising from facts.⁹

Healthcare education deals with particular scenarios. Therefore, students must learn how to learn in order to build their own knowledge. The educator should be their driver by stimulating the knowledge of a particular subject that, in most cases, involves illness, recovery and the social environment in which the patient lives in.¹⁰

The process usually depends on the direct link to the community and on its promotion by interpersonal communication skills developed in the academic field. These fields generate reflection techniques mediated by educators and students in the classroom.¹¹

When one wishes to define or investigate competencies and skills, it is important dissociating them by function, knowhow and by the ability of knowing how to be and to live. One must understand that for an individual to express its own skills, it is demanding that he/she becomes skillful. Such feature provides the evidence of being competent.¹² However, competency is directly associated to grasping and understanding the bio-psycho-social situations presented by the real world. The acquisition of skills grounded in the Phenix Taxonomy defines professional qualities based on ethical, empirical, aesthetic, symbolic, synoetic and synoptic meanings.^{12,13}

Thus, it is expected that the validation of the current questionnaire will improve the perception on the different knowledge forms. Therefore, students need to develop practical skills in order to become care providers and deal with permanent manageability, decision making and communication at community or hospital level.¹⁴⁻¹⁷ Thereby, distinguished pedagogical practices reinforce the construction of a reasonable competence profile. The acquisition of such competency can be analyzed through instruments used

Table 1: Questionnaire on the Perception of Knowledge Acquisition in health courses

<p>COURSE:..... TERM: STUDENT AGE:.....SEX: M.... F..... INSTITUTE:.....DATE: .../.../..... MARK WITH AN X THE ALTERNATIVE THAT INDICATES YOUR PERCEPTION REGARDING THE ACQUISITION OF TECHNICAL-SCIENTIFIC KNOWLEDGE IN THE SUBJECT / CONTENTS:..... 5= strongly agree; 4= agree; 3= neutral; 2= disagree; 1= strongly disagree.</p>						
Nº	DIMENSION 1: WANTED GRADUATE PROFILE	5	4	3	2	1
01	General learning					
02	Theoretical knowledge					
03	Practical knowledge					
04	Articulated knowledge with urban communities					
05	Articulated knowledge with rural communities					
06	Basic care procedures					
07	Hospital learning					
08	Public Health Procedures					
09	Critical and reflective training					
10	Humanistic education					
Nº	DIMENSION 2: KNOWLEDGE AREAS OF TRAINING					
11	Health care					
12	Health problems research					
13	Health problems evaluation					
14	Interventions development					
15	Hypothesizing					
16	Ethics training					
17	Project development training					
18	Ability to identify signs and symptoms					
19	Care and procedures Innovation					
20	Development of public policies for health					
Nº	DIMENSION 3: LEARNING SKILLS TO LEARN, BE AND LIVING					
21	communication					
22	interpersonal relationships					
23	Development of autonomy					
24	Authorship Development					
25	Lifelong learning					
26	Team work					
27	public administration					
28	Education in foreign languages					
29	Learning Ability to learn					
30	Ability to know how to live					
Nº	DIMENSION 3: KNOW HOW SKILLS					
31	Laboratory diagnostics					
32	Clinical diagnosis					
33	Clinical treatment of diseases					
34	Health protection					
35	Health promotion					
36	Health recovery					
37	Bio psychosocial problems of illness					
38	Hospital training					
39	Training/ rural stage					

40	Training public health					
MARK WITH AN X THE BEST OPTION ACCORDING TO THE STRATEGIES USED IN THIS CONTENT / DISCIPLINE 5= always; 4= often, 3= sometimes, 2= rarely, 1= never						
Nº	DIMENSION 5: EDUCATIONAL STRATEGIES OF LEARNING					
41	Real problems					
42	Clinical cases					
43	Group activity					
44	Interdisciplinary					
45	Scientific evidence					
46	Multidisciplinary education					
47	Community education					
48	Simulations with real cases					
49	Internet					
50	Student recovery					

to assess learner’s perception. Such measuring is still a challenge for education in the current century.¹⁸⁻²²

It is important to have a questionnaire template able to carry complexities regarding knowledge development based on expertise and skills and headed towards the promotion, prevention and the healing of diseases associated to the community’s reality.^{2-4,8,17} As it becomes clear, the lack of technical and scientific knowledge by health professionals may involve community healthcare issues that stand out mainly when academic tasks reaffirm knowhow on care giving.^{17,19} It is also worth involving the learning perception response to promote educators’ commitment to the teaching-learning process - which interferes in health professionals’ decision making process when they mean to improve quality of life in the community.²⁰⁻²²

Method

The literature review was the basis for the selection of variable. It structures the dimensions of questionnaire indicators and is a quantitative approach initially developed and designed to become a cross-sectional descriptive study.

The studied population consisted of academics attending college healthcare courses - 29 Pharmacy students and 46 from the Medical school, regularly attending the senior year, totaling 75 students. The questionnaire was applied at School of Sciences of Santa Casa de

Misericordia (Emescam), in Espírito Santo State, Brazil, between 2008 and 2009. All the participants signed the Informed Consent Form (IC).

The template was divided into five dimensions containing ten indicators each, totaling 50 items measured by means of Likert scale - from 5.0 to 1.0 points - for percentage calculation and score determination. The scale scores 10 to the weakest evidence and 50 to the strongest one; scores between 50 and 40 points are considered to be the best ones. The four knowledge score dimensions are determined through values given by the number of questions and the sum of points from the options of choice (5 points: strongly agree; 4 points: agree; 3 points: neither agree nor disagree; 2 points: disagree; and 1 point: strongly disagree). The fifth dimension score uses the expressions: 5 = always; 4 = often; 3 = few times; 2 = almost never; 1 = never. The best score is considered to be the one closer to the sum of points from response number.^{5-4,23}

Indicators in each dimension are distributed according to subjects dealing with the following contents: generalist, humanist, critical and reflexive attitude profiles; knowledge fields associated to clinical skills; competencies and general skills linked to the learning how to learn, to live and to be processes; knowhow on clinical skills; and educational strategies developed during the learning process. The dimensions cover the theoretical activities and practices in the general teaching-learning process; in rural,

urban and hospital internships; and in the primary care and public health activities, according to the questionnaire model shown in table 1.

Prior to the real application, a pre-test pilot experiment was carried out with 20 students from each of the studied courses who were attending their first college years, thus totaling 40 answered instruments – these students actually did not participate in the final sample. The calculation of the Cronbach’s alpha coefficient defines reliability and the internal consistency of the constructs’ indicators within the dimensions. Pearson’s correlation coefficient corroborates the link among indicators to measure the significant correlation among items ranging from -1 to 1. The statistical software SPSS 17.0 IBM SPSS Statistics version 20.0 IBM 1989, 2011 was used as it showed statistically significant correlation coefficient (p-value <0.05).^{24,25}

Result

Table 1 shows the internal consistency of dimensions 1-4 in the 75 (100%) completed questionnaires.

Table 2 illustrates the correlation coefficient between competency indicators and the “know how to do” clinical skill.

Graphic 1 highlights the competency indicators and general skills needed to fulfill the desired profile. Once analyzing a dimension, one can clearly notice that the percentage is diluted by respondents’ different perception levels. Such facility to understand and interpret can be observed in other dimensions of the questionnaire.

The correlation coefficient among questions corroborates the significant relation among items, as shown in Table 3.

The dimension scores can be separately calculated according to the students’ responses, as shown in Table 4.

Table 1 - internal consistency of Dimensions

DIMENSIONS	ALPHA
1	0.806
2	0.865
3	0.908
4	0.800

Discussion

It is recommended that the preparation of an education questionnaire must keep the learning content in mind. It should get individuals’ theoretical and practical participation and focus on initiatives linked to professional behaviors, collective trends, surrounding external expressions and labor.^{17,20} It is also worth remembering the need for involving educational activities focused on humanism in its preparation. Therefore, if teaching was just technicism, the focus would not be on the subject, but on the object.^{1,6}

It is demanding to explore the evolution of health education processes related to

epidemiological studies by using a measuring instrument. The collected data help students to understand why disease development and humanism as well as critical and reflective attitudes should be drawn from the social environment according to the observations upon patients and individuals within their social circle. The urban environment leads to factors that affect citizens. Such factors need to be taught to and perceived by students, since they have to measure their level of understanding about the disease by analyzing the factor through its social projection, in order to achieve patients’ recovery, protection and health. Complex

Table 2 - Correlation Coefficients

INDICATORS	CORRELATION COEFFICIENTS
Laboratory Diagnostics	0.504*
Clinical diagnosis	0.757*
Clinical treatment	0.719*
Prevention	0.599*

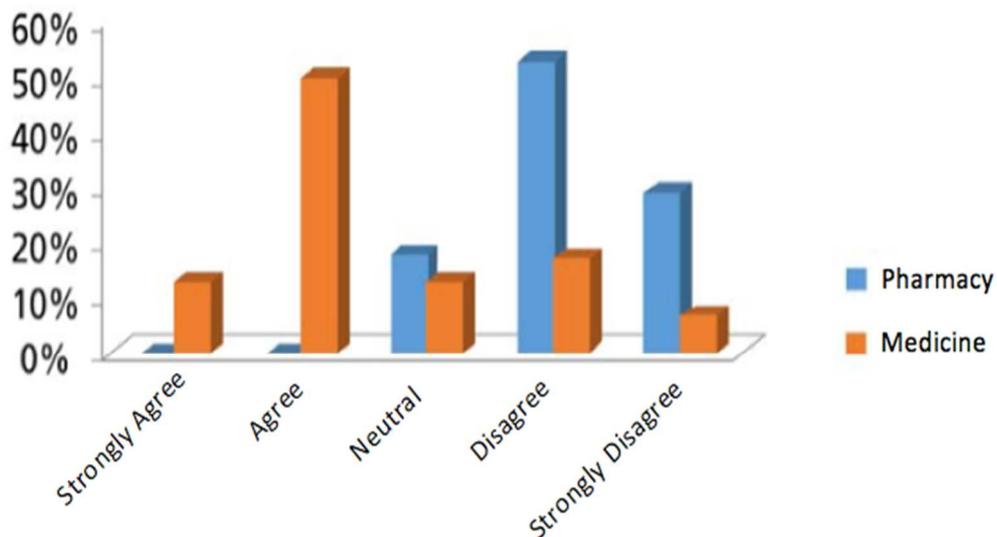
* Correlation coefficients statistically significant (p-value <0.05).

problems faced by society can be shared with students by interdisciplinary contact and by the performance of good educational practices.^{10,11}

Analyzing students' perception about the development of educational skills by emphasizing health education in urban areas and the community involvement helps expanding their profile. Improved perception enhances the quality of life in the community

and makes citizens more critical and reflective. Health education is based on problems experienced by students when they deal with individuals in their social context. It awakes the practical knowledge up and redefines the learning context in which omission may often lead to losses and damages to the community and to the students' formation.^{5,12}

Chart 1 – Hospital Learning



Investigating students' perception about health education, in face of community problems, helps conceptual learning activities

and makes them become complete in terms of attitude and procedures. Thus, students open their eyes to new observation, discovery

and concept development processes, including those related to epidemiology and its interfaces. When teaching emphasizes the communities, more frequent diseases in this environment are evidenced and closely studied.^{8,19} Diversified educational problems regarding urban and rural areas are still reality in some countries. Therefore, the learning educational content needs to link facts associated to students' knowledge on rural issues. Those who do not acquire such knowledge at the end of their undergraduation period may not demonstrate the necessary competencies

and skills for their professional life, mainly the competencies and skills related to public policies.²⁻⁴

It is worth investigating the learning perception about diseases treated in primary care routine, since such knowledge helps students understanding several symptoms and diagnosing cases in the community, whether in the ambulatory clinics or in hospitals. If students disregard the daily life in the communities where they will work in, they may cause knowledge losses that might lead to damages to human beings.^{6, 16,17,19}

Table 3 - Correlation coefficients between the topics of Dimension 5

TOPICS	CORRELATION COEFFICIENTS
Real problems	0.557*
Combining simulation with real cases	0.715*
Clinical cases	0.641*
Community education	0.650*
Scientific evidence	0.620*
Interdisciplinary	0.650*
Group activity	0.709*
Multidisciplinary education	0.605*
Internet	0.657*
Student recovery	0.670*

* Correlation coefficients statistically significant (p-value <0.05).

The investigation based on the healthcare education questionnaire must highlight the value of learning what students question about primary care. Therefore, in this case, the healthcare learning process in the contemporary world goes from simplicity to complexity; and it involves integrative procedures that cover social aspects in diversified scenarios.^{10,15,17,21}

The investigation of hospital education perception must check if the teaching-learning process is reasoned for patients' recovery. Health education must also involve theories regarding knowledge construction, which often demands deep and accurate knowledge in order to achieve organized network activities. However, it implies a logical reasoning balance to deal with

problems presented by hospitalized patients.⁹⁻¹¹

Health education within the hospital involves procedures and specific moments when students and educators can take the advantage of enhancing opportunities to understand the subject and improve knowledge. Often, such goal is lost when educators develop their work focused on themselves. Developing health education based on a hospital-centered character has become quite necessary nowadays. However, such process should be linked to community education.^{8,11,13}

The pillars of an innovative education help reflecting on the indicators of each questionnaire dimension and it strengthens concepts regarding interpersonal aspects of

transmissivity, contagion, popular education and integrality. Healthcare education emphasizing public health has become a concern since the 19th century. Hygiene standards and their control are still a concern that deals with concept definitions based on decrees and laws, with breaking technologies that overcome historical changes based on biological conceptions and with the widely discussed biodiversity in the modernized world.²¹

In 2001, Delors presented a reflection about the education learning process in the 21st century. The reflection was based on performance and attitudes. Thus, the general skills and competencies developed during graduation are supported by technical-scientific knowledge. Therefore, such skills and competencies are translated into the learning to learn, to be, to live together and to do processes. Thus, the current studies aims to discuss different forms of healthcare education using innovative techniques by unfolding the educational discussions on students' competence acquisition and by developing accumulated knowledge based on critical and reflective approaches.¹⁻⁴

In fact, studies on the acquired skills and abilities can be observed, perceived and classified. They are also used to raise hypotheses, carry out deductions and generalize ideas, since they reflect students' cognitive and behavioral aspects.^{7,9,14} The observation process using a questionnaire can be guided or assisted in order to lead to specific information on functions and knowledge, such as on a particular function field based on professional attitudes.^{16,18,22}

The dimension involving educational strategies highlights the way study groups have changed due to technology. The educator needs to be aware of these changes because in the near future they will generate new paradigms, since the current ones are being broken and new communication ways are arising through electronic conversation.^{10,13} Currently, it is common to find students preparing their work group through information generated in the Internet. Thus, there is another type of communication group emerging nowadays. Interdisciplinarity helped the health sector at the millennium turn and it was characterized by knowledge sharing, fragmented labor actions and the expanded understanding about health related issues.^{5,11}

Interdisciplinary exercises in universities require deep changes in the academic life. One of these changes is the opening of effective spaces for its performance during research and extension practices. In fact, exerting university education focused on the curriculum and its reformulation is not enough.¹⁵ It is necessary to experience it in order to reach an active integration among students, educators and interdisciplinary and multidisciplinary communities.^{7,20}

In fact, the students community is going through social changes because individuals' scientific production capacity often faces new insights within the learning framework.^{1,5} Test result stability and the degree of accuracy give reliability to the questionnaire construction; the more homogeneous the test is, the more reliable.^{23,25}

Table 4 – Pharmacy and Medicine Student survey results

DIMENSIONS	MEAN ± STANDARD DEVIATION		RESULTS VARIATION	P-VALUE
	PHARMACY	MEDICINE		
1	19.03 ± 5.39	22.76 ± 4.83	10-50	0.003*
2	6.07 ± 2.72	12.60 ± 3.77	10-50	0.000*
3	29.23 ± 8.27	36.24 ± 6.99	10-50	0.000*
4	47.83 ± 14.04	50.18 ± 12.5	10-50	0.451
5	14.43 ± 4.53	15.40 ± 5.51	10-50	0.712

* p <0.050, rejects the hypothesis of equality.

Conclusion

The questionnaire completed the object of study and its interpretation can be applied to healthcare graduation courses in order to broaden the understanding of an education perception based on the everyday life in the real world; however, it involves skills and competences. Data identification makes result interpretation reliable. The application of the questionnaire clearly leads to the achievement of the herein described aim and it favors its reproduction.

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