Evaluation by Competences in a Clinical Environment of a Public University in Peru

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Abstract

The evaluation of medical students in the clinical setting (outside the classroom) is a great challenge due to the fact that the learning process becomes more complex. There is little scientific literature in which the research ends in an action to design efficient forms of evaluation. We aimed to design and validate an instrument to reach an evaluation by competencies in the Course: Introduction to Clinical Medicine at the National University of San Marcos (UNMSM) in Lima-Peru. This publication follows a research-action methodology, where the initial results led to the design of an evaluation methodology in clinical environments that is then re-evaluated again to determine if it really manages to evaluate the comprehensive skills required in a medical student. Results: 14 professors were interviewed. In the clinical environment, theoretical lectures and planned didactic sessions are used based on clinical cases. In clinical practice, the priority is given to clinical thinking, and problem-based learning (PBL). The reseach team in conjunction with the professors started the evaluation by competences process developing an evaluation instrument for the specific clinical practice. The participants observed resistance to the change because of certain administrative barriers y poor institutional support. The critical point in this investigation was the training in evaluation and learning methodologies. A training plan was required before starting their teaching activities. The professors agreed with the new form of evaluation and recognized the value of the teaching service with responsible and ethical dedication.

Key words*: Evaluation by Competencies, Learning, Professors, Clinical Environment, Faculty of Medicine.*

1. Introduction

A big problem in education, especially when the lessons are taught outside the classroom, is How, Who and When evaluate students. It is not uncommon to see professors falling into the error of making a subjective evaluation (based on experiences with the student) or, on the contrary, falling into the error of

conducting a purely quantitative evaluation based solely on knowledge tests; (Martinez Gonzales, 2015)

When we talk about complex learning, the best way to perform an evaluation is based on the competencies achieved by the student. However, this type of evaluation requires that the actors have both the basic knowledge of the educational methodology and the reality of teaching; (Guerrero-Aragón S & col., 2017). According to the national educational model in Perú; (National University of San Marcos, 2015) the UNMSM accepted in 2013 a curricular structure focused on competencies.

This structure, as seen in figure 1, facilitates the design of research-action-participation interventions, which our research group GI "Educación Médica" has been developing; (Clem Adelman, 1993); (John, 2019). This methodology allows the design of interventions in a constant scenario of lessons learned about the teaching task. However, doing research and then taking actions to improve our teaching work from a multidisciplinary point of view is complex. The task of our research group allows us to work among educators, health professionals, engineers, administrators and economists to develop mixed approaches (qualitative and quantitative) with the aim of implementing systematic educational models.

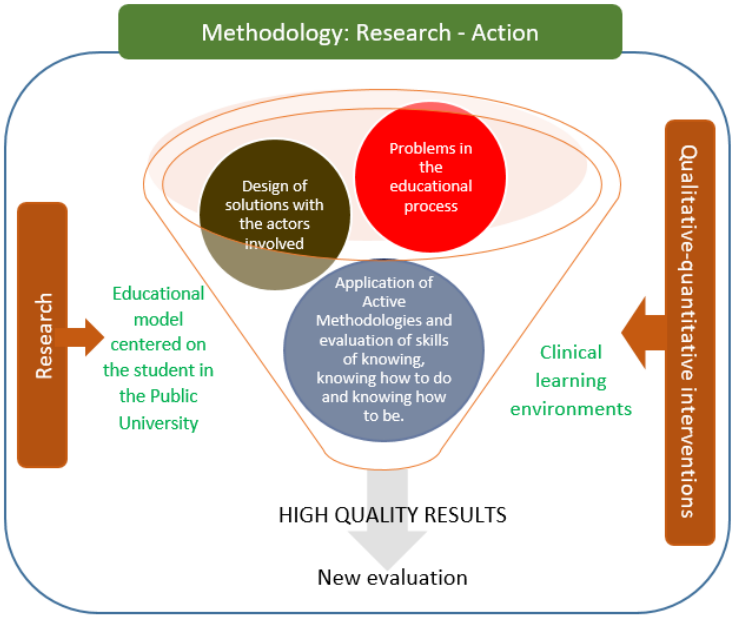

Figure 1. Design of research-action-participation interventions used by our research group

It is important to note that upon reaching the third year, the medical student begins clinical courses with the subject of "Introduction to the Clinic"; (Champin, 2014). National hospitals now begin to become their learning scenarios and at this point, the qualifications of the student must solve a Gordian knot: quantitative evaluations vs. subjective evaluations. Faced with this, professors see the need to create new ways to evaluate students, avoiding the simplicity of the tests and pointing to a "problem-based learning" (PBL) and also the evaluation of skills

such as oral communication and writing , teamwork, critical thinking and reflective thinking with an attitude of service towards the patient and his community; (Correa Bautista J, 2012); (During Montiel M & Col, 2011).

The reason why it is important to focus on this clinical environment is that it is when the educational part mixes with the professional part. Education in this environment has important consequences on the social, personal and health outcomes of patients. It is also important to point out that since the teacher is not necessarily a pedagogical educator, it is necessary to prepare them in this field, mainly in the evaluation, because there is generally no consensus on the specific competences that the student must reach; (Guerrero-Aragón S & Col, 2017); (During Montiel M & Col, 2011); (González-Burboa A, 2016)

According to the official syllabus; (National University of San Marcos, 2015): "The student must obtain/create the clinical record, describes the signs and perform the physical examination to build syndromes establishing an empathic relationship with the patient, respecting their autonomy and confidentiality" Once this is defined, the evaluation by competences should be simple, however it is still complex. The teaching-learning process in a Clinical environment is not always guided, calm and concentrated. Instead, it is carried out in emergency rooms, emergency rooms, with various actors such as students, patients, nurses and supervisors who must follow the biosafety institutional norms, informed consent and respect for the autonomy and confidentiality of the cases

The planning of an evaluation by competences is a complex issue because proposals are required to create instruments that allow objectively evaluate the learning process and strengthen capacities; (Zapatero-Ayuso JA, 2017). Hong, W.P, (2012) believes that to develop skills in practice, it is necessary: to make schedules more flexible, provide resources and time for cooperative work by professors. Also, to achieve a competence, it is necessary to get teachers to accept the change and bet on innovative methodologies; (JF, Lukas. & K. Santiago, 2004). All this considering the integration of the cognitive, the instrumental and the performative. Without this triangulation, there is no possible learning.

With this research we wanted to design and validate an instrument to assess an evaluation by competences in the Course of Introduction to the Clinic 2017 in the School of Medicine of the National University of San Marcos (UNMSM), Lima-Peru, 2017

2. Methodology

Study according to the Research-Action methodology (Martínez-González, A., 2015). We use two approaches: a qualitative approach based on the narrative analysis of interviews with groups of interest: professors / medical assistants who teach "Introduction to the clinic". And also a quantitative approach to making a description of the evaluation process in the course and construction and application of evaluation instruments by competences.

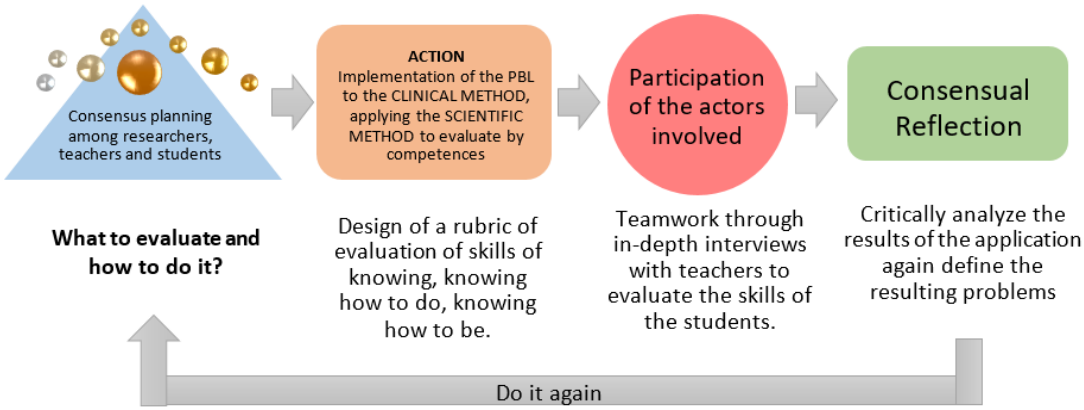

Figure 2. Illustrative representation of the design used for this investigation

Figure 2 represents the flow of this investigation. We begin with the identification of problems "What to evaluate and how to do it?". Then, we start planning with the actors involved. The proposed design for the evaluation of the competences was studied. This was done with the participation of the teachers. The instrument created was evaluated through the verification in scenarios of diverse complexity oriented to the learning with the clinical method and with the development of research skills to achieve the interview to the patient and to achieve instrumental and behavioral skills based on humanistic values based in ethics.

We started by establishing direct communication bridges with those responsible for the topic, explaining the research, the objectives and the confidentiality and anonymity of the results. Then, we hold two awareness sessions, exposing the idea and the intention to change. We also trained in competence assessment and their interaction with the current Syllabus of "Introduction to the Clinic 2017". Then a questionnaire was sent so that the professors themselves could write the expected competences in each chapter of the course. Subsequently, personal interviews were conducted, their narrative responses were analyzed and systematized. These personal interviews were conducted with a structured guide to gather information, select the chapter and the academic activities that are usually carried out. 80 minute sessions were held. The interview was designed to investigate based on four main variables (see table 1).

3. Results

Twenty professors were invited to participate. Those who accepted and with whom the personal interviews were coordinated were 14: Seven professors responsible for the chapter and seven professors responsible for the practices and PBL. In addition to the professors, personal interviews with 2 students were arranged.

The results below describe the main themes that emerged in participant's interview, both on their suggestions and during their narrations.

Table 1: Main dimensions investigated in the interview

Dimension	Definition
I. Didactic capacity in the learning session	Narrate characteristics of theoretical-practical learning session or learning based on PBL. Activities in opening, development and closure.
II. Interactive capacity of the teacher with the Educational Model of San Marcos exercising teaching centered on the student.	Describe the interactive process with the student from the Educational Model of San Marcos. How communication, feedback, and tutoring or counseling is done to the student.
III. Academic and administrative management	Perception of professors in relation to the authorities of the institution, resistance to change, facilities and institutional support, barriers, critical points that influence teaching, dissatisfaction.
IV. Design of matrix of self-evaluation, co-evaluation and evaluation by competences	Professors determine the competences to demonstrate in this learning process

The transcript was sent by mail to determine its validity and reliability. It was only considered finalized when the professor approved the final changes.

3.1.Perception of what the evaluation should include

There was no consensus on what a correct evaluation should include. The answers were diverse. 28% of people evaluate the previous key concepts plus the information of the chapter. 50% evaluate the evaluation of learning and 50% think that the critical point is the evaluation by competence

"Only cognitive evaluation through interaction with open and objective questions for the identification of syndromes"

"In the procedural part, evaluate the performance when performing the physical and clinical examination of the patient; with the elaboration of the clinical history with thoroughness and precision "

"More than any, the attitude with evidence of punctuality…respect for the patient"

3.2. Critical points that influence the evaluation methodology

In practice, the Clinical Method for clinical learning is used. The teacher demonstrates semiological techniques in a healthy subject, to know the normality and differentiate it from the abnormality. 79% focus on the theoretical-practical transfer, where professors demand that the clinical history be completed and the syndromic findings analyzed to generate evidence-based diagnoses.

"Clear and precise communication for the patient. Exploration and analysis of analytical tests "

"We must work a lot in the evaluation, we are developing clinical practice and the evaluation is constant, but we all have to do it very similarly with the same indicators, avoiding the subjectivity and bias in the professors."

3.3. Satisfaction of professors with the result of the teaching process

28% of professors are satisfied because their students investigate, are motivated and consider them professors and friends. 35% indicate that their graduates return to services to continue with their residency, 28% indicate that their students identify strongly with their Alma Mater.

"A group of students was totally unmotivated, then I make change their expression. I always look for patient with interesting cases and the comments about the rotation with me is very satisfactory. Always dedicating myself to teaching correctly, I do what must be done in teaching ".

"The students want to participate in the research we do… satisfaction because our research topics attract them and want to be part of the team"

3.4. Design of matrices of self-evaluation, co-evaluation and evaluation by competences

75% of professors mention that they use it tacitly in their practical activity, in their talks and discussion of medical records, stating that it is an "Integral evaluation, with a respectful and empathetic attitude, with critical judgment when performing the clinical examination to the patient for syndromic identification ".

"[I] make an exhaustive evaluation of his respectful and empathic attitude, in addition to a cognitive evaluation that I make at the time of the patient's clinical examination for the syndromic identification"

"We are still in traditional evaluation, we are slowly starting the implementation of competency assessment."

3.5. Facilities and institutional support

50% of professors feel supported by the central management in the modernization of the environments for the implementation of PBL and the evaluation by competences. 50% have requested the curriculum evaluated by competences, but do not understand how to evaluate it. 35% require training to achieve proficiency evaluations. 35% think that they require more professors committed institutionally.

"If we are entering the new active methodologies and feel the difference, I am changing the strategy of the class, with satisfaction in the course".

With this, one question arises: how can we integrate all the different methodological models used in the course "Introduction to the Clinic"? Our team, together with the professors, generated a table where the steps of the three main methodologies used were integrated. (see table 2)

In the development of the PBL methodology, students must present a hypothesis about the problem. Through the clinical method, the student generates skills to achieve an adequate doctor-patient communication and thus identify and look for signs and symptoms. According to Serra V. M, 2014 ; the clinical reasoning raises a mental scheme that will allow to propose probable hypotheses sustained with evidences; which is a fundamental step and inducer of the cognitive process for the development of PBL.

Table 2- Integration of meaningful learning methods and evaluation by competences

Scientific Method	**Clinical Method**	**PBL Method**
1. Observation	1. Observation	1. Observation
2. Problematization	2. Problematization	2. Problematization
3. Goals	3. Identification of clinical objective	3. Identification of the main problem
4. Methods	4. Strategies with clinical reasoning	4. Development of the syndrome with clinical reasoning
5. Results	5. Results	5. Construction of the work plan
6. Conclusion	6. Diagnosis	6. Agreed consensus
	7. Treatment	7. Conclusion
	8. Evaluation and monitoring	

When the analysis of the interviews and the verification of the data by the professors finished, the creation of the competency evaluation matrix began. A complex matrix with several indicators was created, which after several sessions of feedback about its practicality was finally reduced to the evaluation of only 4 indicators:

1. Critical analysis with clinical reasoning for the problematization, generation of hypotheses and the achievement of learning.
2. Review of the information for the construction of the solution of the problem with the clinical reasoning,
3. Respect the ideas of their colleagues, work responsibly in the team, contributing and enriching with their knowledge,
4. Construction of the mental map for the argued discussion and for the solution of the problem. Presentation of the diagnosis

Also a table of operational definitions of the level of achievement in each indicator was created. (see table 3). The rating scale is percentage in this order: The maximum (100%) indicates that the student has achieved the skills in clinical

learning. 80% says that there is evidence of competition and it is approved. Less 80% means that the student must improve their skills

Table 3- Representation of the competences to be demonstrated in the medical student in a Clinical Environment.

Achievement and Operational definitions
Critical analysis with clinical reasoning for the problematization, generation of hypotheses and achievement of learning.
50% Contrast the physiopathological bases with the signs and symptoms of the health problem, formulated with critical analysis and clinical reasoning.
75% Contrast the physiopathological bases with the signs and symptoms of the health problem, formulated with critical analysis and clinical reasoning. Defining the relevant hypotheses.
100% Contrast the physiopathological bases with the signs and symptoms of the health problem, formulated with critical analysis and clinical reasoning. Defining the relevant hypotheses, and establishing the learning achievements.
Review of the information for the construction of the solution of the problem with clinical reasoning.
50% Reviews the basic scientific evidence, organizes the inventory of basic and unknown knowledge.
75% Reviews the basic scientific evidence, organizes the inventory of basic knowledge and the unknown. Posing the critical analysis of the information.
100% Reviews the basic scientific evidence, organizes the inventory of basic knowledge and the unknown. Posing the critical analysis of the information to design the proposed solution.
Respects the ideas of their colleagues, works responsibly in the team, contributing and enriching with their knowledge.
50% Works individually and as a leader for critical analysis with clinical reasoning.
75% Works individually and as a team for critical analysis with clinical reasoning, through effective and respectful communication with colleagues and teacher.
100% Responsible individual and team work for critical analysis with clinical reasoning through effective and respectful communication with their peers and teacher and efficiently contributes to their work group.
Construction of the mental map for the discussion argued by the clinical reasoning in the solution of the problem. Present the diagnosis.
50% It builds the didactic mind map integrating the ideas strength of the physiopathology and the organization of the systems related to the health problem.
75% It constructs the mental map didactically integrating the ideas of physiopathology strength and the organization of the systems related to the health problem.
100% It builds the didactic mind map integrating the ideas strength of the physiopathology and the organization of the systems related to the health problem. Argue the solution of the problem with clinical reasoning.

4. Discussion

The small number of participants in this study (14 professors, 2 students) does not minimize the contributions of the research results. Especially if one takes into account the methodology used (narrative, surveys, telephone interviews and in depth) and the representativeness of the population (main professors, associates, doctors and professors, chapter heads and two delegated students from the upper third). This educational research in Introduction to the 2017 UNMSM Clinic allowed us to highlight several problems to overcome, also found in similar studies, (Risco de Domínguez G, 2014); (Pinilla A. & Cárdenas, 2014); (Correa Bautista J, 2012); against which we will prioritize the following:against which we will prioritize the following: It is necessary to unravel the problem of the evaluations that according to our criteria should be carried out with objective criteria (not subjective or memorial as they are currently); (Ma B. I., During A., Martínez S., López J., Lozano M., Sánchez M., 2011), through the acquisition of skills, helped by PBL methodologies, clinical methodologies and scientific, perfected with informed consent and adherence to institutional biosecurity and hospital norms (Ministry of Health Peru, 2016). All this while maintaining a deep respect for the patient, who is a human being like us in transitory or chronic difficulties. Regarding the evaluation by competences, in the interviews it was found that until now the use of written, highly criticized 20 persists, against which in this study evaluations are proposed supported by logical, critical and reflective mental reasoning (PBL, clinical method, scientific method), prioritizing the use of cognitive processes by students (Clem A., 1993); (Rivera N., Gómez M, Sotolongo M., 2017) and facilitated by the use of matrices created by professors who participated in this study. The use of matrices created by our professors is increasing, the use of these in clinical-hospital environments continues to be a challenge. Matrices or evaluation instruments become easy tools to use to avoid subjectivism (Ruiz-Hoyos B, Cardona-Rivas D., 2016) by avoiding a qualification without evidence of achievement (Viniegra-Velázquez L. , 2017). In the teaching process, the teacher's presentation begins with respect to the students, generating a climate of affective learning, promoting learning through motivation showing real health problems and cases related to the topic, (Correa-Bautista J., 2017). If we plan a structured evaluation with Evidence of achievement of competences, this requires time to learn and for the formation of attitudes and cognitive and procedural skills. The use of the PBL methodology, according to the interviewees, generates and prioritizes clinical and critical reasoning, the search for evidences, reflective thinking. In our medical school: the discussion of clinical cases is highly valued by professors, for being a sustenance of rationality. Although a matrix of general competence has been designed, similar ones still need to be generated for other activities, such as matrices for reasoned anamnesis. Also, interestingly, 42% of professors perform feedback of knowledge with students by email or whatsapp, but only by questions derived from the practices. In theoretical issues, feedback is almost non-existent.

Another aspect evidenced in this study is the limited support that our medical school offers to the use of technology and innovation in education. The use of educational technologies could improve the achievement of competencies, (Eggen

& Kauchak, 2012); (Mendoza HJ, Placencia MD, 2017); (De Souza C., Alves M., Kusumota L, Pirani V., Lima de Mello C. & Campos E., 2015).
Four deans of medical faculties in Latin America presented their opinions on the renewed curricula in our faculty, noting the little importance given to the incorporation of educational technology in support of rationality and teaching-learning, which contrasts with the reality observed in developed countries, (Mendoza HJ, Placencia MD, 2017)

50% of professors believe that the administration is very centralized, to the detriment of places. On the other hand, hospital wards are becoming insufficient due to the proliferation of medical schools. Some even think that it is not enough to train, you have to compromise. It is important to carry out an institutional teacher training plan before the start of the academic year, because medical professors are unaware of the existence of teaching tools. Facing the changing international and national educational models based on competences; Professors and authorities must be prepared to evaluate and qualify competences, build instruments, apply them with dedication and reflection.

4. Conclusions

We note that despite all the difficulties, teachers and students have a sense of improvement in the teaching-learning process.

The instrument created manages to cover the categories necessary to evaluate the skills of a medical student in a clinical environment. These skills are related to empathic communication and the development of clinical history based on research and the integration of knowledge to achieve a diagnostic presumption.

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