Revista ELectrónica de Investigación y EValuación Educativa

RELIEVE

e-Journal of Educational Research, Assessment and Evaluation

ISSN: 1134-4032

Design and validation of an evaluation questionnaire of clinical supervision

Diseño y validación de un cuestionario de evaluación de la supervisión clínica

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Abstract

Clinical supervision in medicine is a mode of teaching in the service that pursues as an end the independent practice of the medical profession. In clinical supervision, the teacher assumes a role modeling student performance in a context of real professional practice. The goal of this article is to report the research process that allowed the development of a questionnaire of formative evaluation of clinical supervision based on the opinion of the students. The method consisted of three empirical studies. (i) a process of exploration of the context of clinical supervision that was achieved through documentary analysis and semi-structured interviews; (ii) the design of the formative evaluation questionnaire for clinical supervision in medicine, which required the identification in the literature of the domains of clinical supervisors define an instrument planning matrix, submit the planning matrix to content validation by experts, a pilot study and a content validation process of the items; and (iii) a third study to generate validity and reliability evidences. The results revolve around the construction of a formative evaluation questionnaire of clinical supervision that allows valid and reliable interpretations. The evidence generated in the research confirm that the evaluation of the teaching competences, regardless of the context, requires consider the didactic planning, the conduction of the teaching process itself and the evaluation of the learning of the students.

Keywords: medicine, formative evaluation, teaching evaluation, student evaluation of teacher performance, test validity.

Reception Date
2017 February 13

Approval Date
2018 March 13

Publication Date:
2018 March 15

Resumen

La supervisión clínica en medicina es una modalidad de enseñanza en el servicio que persigue como fin la práctica independiente de la profesión médica. En la supervisión clínica el profesor asume una función de modelador del desempeño de los estudiantes en un contexto de práctica profesional real. El objetivo de este artículo es reportar el proceso de investigación que permitió desarrollar un cuestionario de evaluación formativa de la supervisión clínica con base en la opinión de los estudiantes. El método consistió en tres estudios empíricos: (i) un proceso de exploración del contexto de la supervisión clínica que se logró mediante el análisis documental y entrevistas semiestructuradas; (ii) el diseño del cuestionario de evaluación formativa de la supervisión clínica en medicina, lo cual requirió la identificación en la literatura de los dominios de los supervisores clínicos, definir una matriz de especificación del instrumento, someter la matriz de especificación a validación de contenido por expertos, un estudio piloto y un proceso de validación de contenido de los ítems; y (iii) un tercer estudio de generación de evidencias de validez y fiabilidad de las interpretaciones producto de las mediciones. Los resultados giran en torno a la construcción de un cuestionario de evaluación formativa de la supervisión clínica que permite interpretaciones válidas y fiables. Las evidencias generadas en la investigación confirman que la evaluación de las competencias docentes, independientemente del contexto, requiere considerar la previsión/planificación didáctica, la conducción del proceso de enseñanza propiamente dicho y la evaluación de los aprendizajes de los estudiantes.

Palabras clave: medicina, evaluación formativa, evaluación de la docencia con base en la opinión de los estudiantes, validez de cuestionario.

Fecha de recepción
2017 Febrero 13

Fecha de aprobación
2018 Marzo 13

Fecha de publicación
2018 Marzo 15

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The clinical supervision in medicine is a mode of teaching in the service that seeks to independent practice of the medical profession (Schumacher et al., 2013). In the clinical supervision, the teacher takes the role of a modeler of the performances of the students, in a context of real professional practice, where the pedagogical content is the care of patients, their families and the needs of the health institution which carries out the educational process (Lifshitz-Guinzberg, 2012; Santana et al., 2013; Schumacher et al., 2013).

It is so that the clinical supervision has two core and interrelated features: on the one hand, focuses on the comprehensive care of patients in disease condition, and on the other hand promotes gradually independency of the student's practice of the medical profession.

In these conditions, the clinical supervisor in medicine requires, in the first place, to foresee all the possible scenarios for its work through the planning for teaching and learning. Must be established the training goals, strategies that will hand in certain conditions, the materials they need to develop their work and procedures to ensure the achievement of the goals (Cruess et al., 2008; Hore, Lancashire and Montreal, 2009; Falender & Shafranske, 2004; Jochemsen-Van der Leeuw et al., 2013; Paice et al., 2002).

In the second place, it is necessary that the clinical supervisor ensure that its students master the skills of medical professionals. For this purpose, the modeling is the method par excellence, through which the supervisor promotes the progressive autonomy, starting to show the procedures, promote the questions and answers, encourage your students try to supervised these procedures, to achieve the independent execution of the activities in question (HHS, s/f; Irby, 1994; Kennedy, Regehr, Baker & Lingard, 2005).

The third element of the clinical supervision refers to the permanent monitoring of the performance of the students and the adjustment of the didactic strategies used to meet the needs that arise in the training process. As a result, the assessment of the supervised learning is a fundamental element for the effectiveness of the clinical supervision in medicine (During, 2006; Epstein, 2007; Fornells-Valles, 2009; Fluit et al., 2010; Kilminster & Jolly, 2000).

In summary, the clinical supervision in medicine is a highly complex form of teaching, since the learning process is not limited to content and context, as the object of study is centered on the needs of sick people. Based on this complexity, the evaluation of the clinical supervision in medicine becomes a need in order to promote reflection about their own practice and constant improvement of the performance of the supervisors. Such assessment must be contextualized and developed in a systematic way to ensure that the resulting information is useful.

They are recognized, at least three strategies to assess the clinical supervision: (i) the self-assessment, (ii) the academic performance of the students, and (iii) the assessment based on the opinion of students (Gómez, Rosales & Vázquez, 2014). The evaluation of the clinical supervision based on the opinion of students is the most usual strategy at the international level, in accordance with the specialized literature.

Despite that it is recognized that the evaluation of the clinical supervision is a mandatory process, and essential for the improvement of this type of teaching practice, in the literature analyzed was detected a lack of theoretical development and, above all, empirical evidence. That is, unlike what happens in the classroom activities, there is little empirical evidence that describes how medicine is taught in the clinical environment in direct patient care and, mainly, how do you assess the clinical supervisors in medicine (Fluit et al., 2010; Gomez, Rosales & Vázquez, 2014).

This situation as identified in the literature is consistent with the particular case of the Autonomous University of Baja California, this is due to the fact that there is little documented evidence of the purpose, the object and the methods used to evaluate the clinical

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supervisors in the bachelor's degree in medicine that such institution offers.

The aim of this article is to report the research process that enabled us to develop a questionnaire of formative evaluation of the clinical supervision in the Bachelor's Degree in Medicine at the Autonomous University of Baja California based on the opinion of the students. This research took three years long.

Method

The work was divided into three studies: an exploratory study that persecuted the characterization of the context of the clinical supervision, a second study of design of the questionnaire and a third study for generation of evidence of validity and reliability of the interpretations of the measurements. This division was due to the need to logically organize the investigation, which helped to refine each of the stages that were attributable to particular purposes and to highlight the findings of each one.

Study 1. Exploration of the context

In order to characterize the clinical supervision in the Bachelor's Degree in Medicine at the Autonomous University of Baja California in Mexico, we analyzed the policy context of the educational program and consulted with experts in the area. The description of the participants, materials and procedure are presented below.

Key informants

We interviewed a group of six clinical supervisors of medicine who collaborate in the University studied and in health institutions that receive students from the Bachelor's Degree in Medicine in the clinical stages. The key informants were identified according to three criteria: (i) Supervisors play in teaching activities in clinical fields of medicine; (ii) experience equal to or greater than five years as clinical supervisor in medicine; (iii) were not considered as selection criteria the gender, age or economic status.

Materials

Used an interview guide with a general question about the characteristics of the clinical supervision in medicine and four specific questions on the planning, the process of teaching, assessment and the main problems faced by clinical supervisors in their work.

Procedure

The exploration was carried out in two phases: a documentary analysis of the normativity of clinical supervision and an empirical stage of consultation to supervisors. In the first phase, we analyzed the curriculum of the Bachelor's Degree in Medicine, recovered the information that would make it possible to understand how it is taught in the clinical fields and how it evaluates to the supervisors.

In the second phase, interviewed a group of six doctors who serve as clinical supervisors. The information was recorded by audio recordings, then transcribe them and analyze them by using the technique of content analysis. The content analysis carried out with the transcripts of the interviews was inductive type, that is, on the basis of the information emerging from the informants were generating codes and categories. The categorization was a process that was developed in four phases: (i) The author of this work and an external reader coded the transcripts of the interviews; (ii) then discussed the differences of codes and agreed on the final codes; (iii) were constructed categories of analysis; and (iv) finally, inductive inferences were drawn up.

Study 2. Design of the Evaluation Questionnaire

The second study was developed with the purpose to answer the question what are the essential elements that must be considered in order to assess the competencies of the clinical supervisors in medicine based on the opinion of the students?

Participants

Were used to three groups of people and an individual participant in different moments of the process: (i) a group of experts from the

clinical supervision of the medicine of the Autonomous University of Baja California, who validated the array of specification of the questionnaire designed; (ii) another group of experts from the clinical supervision of the medicine of several public health institutions in Mexico, who validated the content of the questionnaire; (iii) a third group composed of undergraduate students in medicine of a Mexican public university, who were part of the pilot study; and (iv) an expert in grammar.

Materials

The evaluation model of teaching competence (MECD) [García-Cabrero et al., 2008] was the main material that allowed the present investigation. The MECD is based on four dimensions: institutional context, forecasting, conduct and evaluation of teaching and learning processes.

Procedure

The research was developed in five phases ranging from the identification of the domains of the clinical supervisor to the integration of the questionnaire, the validation of the content and implementation of the questionnaire to an intentional sample in the pilot study.

Phase 1. Design of the array of specification of the questionnaire

Based on the information collected in the specialized literature, we defined the domains that should be considered to evaluate the clinical supervisors in medicine, to subsequently disaggregate in items and integrate an array of specification of the questionnaire.

Phase 2. Validation by experts from the array of specification of the questionnaire

The dimensions, skills and items that constitute the matrix of specification were put to consideration of a Psychometric specialist and four experts in the clinical supervision. In this session with experts were assessed three elements: (i) the clarity of the reagent, which refers to the degree to which the item communicates in an objective way the statement; (ii) the feasibility of the reagent, is the degree to which the item can be answered by the student; and (iii) the consistency, which refers to the extent to which the items correspond logically with the jurisdiction to which they belong. The judgments of the experts were treated by the qualitative analysis of content and took into consideration those modifications that were proposed by at least two judges. The product of this phase was the first version of the questionnaire with the items to be used in the pilot phase of the study.

Phase 3. Pilot study

In this phase was implemented the first version of the questionnaire to 37 medical students enrolled in clinical learning units of the Universidad Autónoma de Baja California, with the purpose of analyzing the internal consistency of the questionnaire and start with the debugging of the items.

Phase 4. Definition of the key elements

Experts were asked to assess the items describing them as proposed with Lawshe (1975): essential items, items useful, but not essential and items you don't need.

To analyze the information product of consultation to experts used the proposal for the adaptation of the Content Validity Ratio (CVR) and Content Validity Index (CVI) originally proposed by lawshe (1975) and modified by Tristan (2008). The algebraic expression used for the calculation of the CVR' was:

$$\mathbf{CVR'} = \frac{n_e}{N}$$

Where:

n e= number of experts who have agreed on the key category.

N= total number of experts that participated in the process with experts.

We used the amendment proposed by Tristan because the original version of Lawshe proved is too rigorous: according to Lawshe (1975), requires a very large number of experts to validate the contents of a questionnaire or a very high level of agreement between few experts; for example, to the number of judges

that was used in this study (n=6) is required a level of agreement of 0.99. For its part, the Content Validity Index (CVI) was calculated using a simple average of all items to be acceptable (TRC ≥0.58).

Phase 5. Integration of the questionnaire

In this phase were integrated the results of the pilot study and validation by expert consultation, in such a way that it was unable to debug the instrument and have a more parsimonious and appropriate. The criteria to discard items were: (i) the items with a value of less than .35 in the index of homogeneity corrected; (ii) the items that present similar comments from the judges and the students who participated in the pilot; and (iii) the items you obtain values below 0.5823 in the calculation of the Content Validity Ratio (CVR) was considered essential not in accord with the criteria proposed by Tristan (2008).

Study 3. Evidence of reliability and validity

The goal of this study is to generate evidence of validity and reliability of the interpretations that are produced with the use of the questionnaire developed, this was achieved through a process of cross-validation.

Participants

The total sample (n=350) was obtained by the stratified probabilistic sampling with proportional affixation, in order to achieve this, it was considered the total number of students enrolled in the discipline as population, that is, 1490 students who are in subjects considered clinics. The percentages were defined that corresponded to each stratum and the calculation of the sample with finite universe. By using a list of fees that participants were selected within each stratum would be considered in the study.

Materials

Used the questionnaire for the evaluation of the competencies of clinical supervision in medicine designed in this research as only material. The questionnaire is divided into five factors and 38 items on an ordinal scale Likert-type four answer choices (never, almost never, sometimes and always).

Procedure

In this phase was developed the final version of the questionnaire and consists of four steps: (i) the application of the questionnaire to a statistically representative sample; (ii) the capture of the records the result of the application; (iii) a cross-validation process: an exploratory factor analysis with one half of the sample and a confirmatory factor analysis with the other half; and (iv) a proposed procedure for interpreting the results of the application of the questionnaire.

In this sense, with half of the sample took place on Exploratory Factor Analysis (EFA) based on the five dimensions that were originally designed in the matrix of specification, however, the data indicated that it was not the ideal structure, so that a EFA free to define the optimum number of factors. With the other half of the sample was made a Confirmatory Factor Analysis (CFA)

Results

The general objective and specific research objectives were achieved through the development of the questionnaire of formative evaluation of the competencies of the clinical supervisors in medicine. The process of building showed the systematic and scientific rigor with which reached the product. With the purpose of consistency, here are the results for each study.

Study 1. Exploration of the context

The Degree in Medicine analyzed is organized in three stages: a basic introductory stage which takes place almost exclusively in the classrooms in the faculty, a second phase of a discipline that develops predominantly in the clinical fields (direct patient care), and a third terminal stage that corresponds to the rotating internship undergraduates fully develops in health institutions. It should be noted that the courses that are directly attending to patients under the supervision of a specialist are present throughout the three stages, being the second stage that concentrates the largest number of courses and in which has focused research.

This form of curricular organization is consistent with the arguments of Hamui et al. (2012) on the types of activities that emphasize in medical education in Mexico: schoolroom activities, laboratory and clinical activities. Also, there is an agreement in the literature on the grounds that the medical training is a continuum that ranges from the theoretical methodological training introductory, intermediate and advanced real practice (Miller, 1990; FLUIT, Bolhuis, Grol, Laan, & Wensing, 2010; Lifshitz-Guinzberg, 2012; Santana, Lifshitz-Guinzberg, Castle, & Prieto, 2013).

In the literature analyzed were found arguments concordant with the results of the exploratory study: there is little empirical evidence on the teaching and evaluative processes that are developed in the clinical supervision of the medicine, and there is almost no academic debate around this paucity of evidence (Fluit et al., 2010; Gomez, Rosales & Vázquez, 2014).

The modeling is the teaching strategy for excellence in teaching clinic of the Degree in Medicine. Through the modeling, the experts show clinical procedures for later yield on a gradual implementation of the treatment, providing the necessary feedback for continuous improvement of the performance of the monitored.

According to the interviewees, the main areas of opportunity can be subsumed under the need to systematically document the activities that are developed in the clinical supervision. No evidence was found of the instructional planning of the clinical supervision and there continues to be resistance on the part of supervisors to develop it. The process of learning assessment also lacks consistency.

The clinical supervisors for a Degree in Medicine valued as the central element of the work of the professional care, timely and human patients in disease condition. In addition, assume the responsibility for the transmission of the archetype of doctor: the reproduction of the life style of the physician, including the physical appearance and the maintenance of social prestige.

Study 2. Design of the questionnaire

Phase 1. Design of the specification matrix

The result of this phase was a matrix of specification composed of five competencies and 60 items, as shown in table 1.

Table 1 - *Elements of the matrix*

Competence	Definition	Items
Planning the monitoring program	Considers the establishment (adequacy) together with the students of the goals of the training objectives, tasks, strategies, time, space, resources and evaluation criteria on the basis of the program of studies and the specific conditions of the institution.	9
To manage the process of supervision	Considers the training actions carried out by the supervisor to support individual and group plans of intervention. These activities are carried out before, during, and after the intervention, and includes the generation of a social climate appropriate for the personal and professional development of those supervised.	22
To follow up, adjust, and monitor the actions developed	Considers various forms of feedback to the performances of the students and the implementation of strategies for formative assessment.	10
Use appropriate forms of communication to carry out the work of supervision	Considers the communication of ideas, knowledge and feelings to generate trust and empathy with the supervised and the promotion of critical thinking and reflective.	13
To assess the processes of individual and group supervision	Takes note of the assessment of achievement of the goals of the training, service to the community, in the intervention, as well as of the strategies used.	6

Phase 2. Validation by experts of specification matrix

Expert valuations were not unambiguous, that is, not necessarily an agreement existed.

In the table 2 shows the relationship of items which, in the opinion of the judges, deserve to be analyzed again.

Table 2 - *Items susceptible to be modified based on the opinion of experts*

	Clarity	Feasibility	Consistency
Judge 1	Ítems 13, 15, 16 y 30	Ítems 2, 3, 4, 6, 8 y 58	N.A.
Judge 2	Ítems 2, 3, 4, 5, 7, 8, 13, 14, 15, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 31, 32, 36, 38, 39, 40, 44, 45, 48 and 49	Ítems 12, 16, 17, 25, 55, 56, 57, 59 and 60	N.A.
Judge 3	Ítems 2, 3, 4, 5, 6, 7, 10, 22, 23, 24, 25, 26, 29, 30, 32, 33, 36, 37, 39, 44, 45, 46, 52, 55, 56 and 57	N.A.	Ítems 1, 8, 9, 11, 12, 13, 14, 15, 16, 17, 38, 39, 43, 47, 50, 51, 52, 53, 54 and 58
Judge 4	Ítems 29 and 31	N.A.	N.A.
Judge 5	N.A.	N.A.	N.A.

To use the information of the expert consultation of the array of specification and integrate the first version of the questionnaire, it was decided to make changes only to those items which were the subject of similar comments by at least two judges. On this basis, it took the following decisions: (i) changed the wording of the items 13, 15, 26 and 30; and (ii) is deleted items 3 and 4 which are subsumed in the number 2, a similar case happened with the reagent number 5 was already contained in the 7. In this way was a questionnaire of 57 items that was used in the pilot.

Phase 3. Pilot study

The index of reliability obtained through the calculation of the Cronbach's Alpha for the measurements obtained with the 57 items is 0,947, which is interpreted as an excellent value. To analyze the correlations between the items and the total of the measure, we identified seven items with non-significant values below 0.35 and that, if removed, would not affect the reliability (see table 3).

Table 3 - *The corrected item-total correlations of less than 0,350*

Item	Corrected item-total correlation	Alpha if Item is deleted
1	.102	.947
9	.093	.948
13	.305	.946
14	.340	.946
37	.308	.946
38	.048	.948
47	.312	.946

In addition to the above, students who participated in the pilot of the questionnaire expressed orally and written a number of elements that could be considered to improve the clarity of the instrument (see table 4). The comments are organized around (i) problems with the scale; (ii) the clarity of the items; (iii) the redundancy between items; and (v) the lack of correspondence with empirical reality.

Table 4 - *Comments of students participating in the pilot study*

Item	Comment	Interpretation
All	"The answers almost never, and sometimes i seem to that are the same, I do not know what is the difference"	The scale of response does not discriminate
3, 4, 5 and 6	"This is done only at the beginning of the course, how can I tell if he always does it if I took only one class with the teacher?"	It is not possible to measure in frequency, since they are events that occur only once
5	"What is a learning unit?"	There is a lack of clarity in the concept
4,5 and 6	"The plan should include the units of learning and assessment criteria, right?"	Redundancy in items
17	"We never plan, teachers are the ones who always say what to do"	Does not correspond with the empirical reality
18, 19, 20 and 21	"These questions [19, 20, 21] are the same as this [18], only waist time"	Redundancy in items
22 and 35	"Ask the same"	Redundancy in items
27	"Note: In medicine, in my experience, here never give us time to reflect [sad face]"	Does not correspond with the empirical reality
33	"They never promote to analyze our own performance"	Does not correspond with the empirical reality
45 and 46	"Ask the same"	Redundancy in items
25, 32, 33, 53, 56	"All the questions that evaluate the feedback, it seems that they are the same"	Redundancy in items

Phase 4. Definition of the key elements

The experts distinguished between those items that are essential and non-essential in a validation format designed for that purpose. On this basis, shows the relationship of items that did not reach the minimum value of Content Validity Ratio (CVR) of 0.5823. It is thus that, of the total of 57 items brought to trial, 13 did not reach the minimum value of TRC. The items 11, 14, 18, 24, 26, 28, 29, 34, 35, 41, 42, 50 and 51 are disposable based on the opinion of the experts (see table 5).

Table 5 - *Items with a Content Validity Ratio of less than 0.5823.*

Item	CVR
11. Guide students in the development of a work schedule that fits the requirements of the program at headquarters.	0.333
14. Provides guidance to students to include in the planning of the intervention: guidelines, procedures, and tools for detection of needs.	0.5
18. Organizes sessions of analysis of cases for students to link theory with practice.	0.5
24. In the course of an intervention is incorporated to model and/or correct students.	0.333
26. Uses a variety of teaching resources to show students how to intervene effectively in the scenario (video recordings, transcripts of interviews, reports).	0.5
28. When students are faced with a crisis situation, before or during the intervention, promote supports containment.	0.5
29. Encourages students to talk about the factors that influence the scope and limitations of their interventions.	0.5
34. Recommends materials and specific readings according to the needs that are detected during his speech.	0.5
35. Supports students through modeling and direct intervention for the solution of problems that are presented on the stage.	0.333
41. Expresses their emotions in a timely manner to situations that arise during the monitoring process.	0.333
42. Expresses their emotions in a respectful manner to situations that arise during the monitoring process	0.5
50. During supervisory sessions considered a reasonable time for the student to be able to respond.	0.5
51. Communicate high expectations of performance to the students.	0.166

Phase 5. Integration of the questionnaire

Items number 1, 9, 13, 14, 37, 38 and 47 were corrected homogeneity index of less than 0,350, by which it was decided to remove them from the questionnaire. With the calculation of the TRC were able to identify 13 items (11, 14, 18, 24, 26, 28, 29, 34, 35, 41, 42, 50 and 51) that can be discarded for being unable to obtain a minimum value of 0.5823 in the reason mentioned, which means they are not essential contents.

Based on the decisions taken on the basis of the information gathered, the second version of the questionnaire consists of 38 items, divided into five powers: (i) the competence of "plan the program of supervision" composed of five items, (ii) the competence "manage the monitoring process" that includes 13 items, (iii) the competence "to follow up, adjust, and monitor the actions developed" composed of eight items, (iv) the competence "use appropriate forms of communication" that integrates seven items, and (v) the competence "to assess the processes of individual and group supervision" formed by five items.

Study 3. Evidence of reliability and validity

Through this study we analyzed the internal structure of the questionnaire designed in search for evidence of validity and reliability of the product of its application. In such a way that this section presents the results of the EFA, CFA, the final structure of the questionnaire and a proposal for the interpretation of the results.

Exploratory Factor Analysis

The removal of factors is carried out using the method of least squares not weighted (ULS); by rotating the factors extracted by the method PROMIN, 3 were identified variables that have a load greater than or equal to 0,300 in more than one factor: items 16, 18 and 28 (see table 6).

Table 6 - *Rotated** factorial matrix* of two factors.*

Ítem	Factor 1	Factor 2
1.		0.835
2.		0.662
3.		0.772
4.		0.888
5.		0.961
6.		0.350
7.	0.663	
8.	0.581	
9.	0.532	
10.		0.565
11.	0.500	
12.	0.828	
13.	0.754	
14.	0.541	
15.	0.617	
16.	0.371	0.389
17.	0.912	
18.	1.030	-0.429
19.	0.964	
20.	0.826	
21.	0.924	
22.	0.514	
23.	0.645	
24.	0.562	
25.	0.681	
26.	0.717	
27.		0.540
28.	0.320	0.392
29.		0.482
30.		0.487
31.		0.563
32.		0.847
33.		0.800
34.		0.932
35.		0.872
36.		0.635
37.		0.615
38.		0.609

* Values of less than 0.30 have been omitted; ** Oblique rotation PROMIN.

The next step was to change the PROMAX rotation method; however, the loads crusades continued to occur in the same three factors that with the PROMIN. To exclude the three variables of the calculation and return to rotate cross-load was presented two items that had not results in the calculations above: the items number 29 and 30.

In view of the fact that emerged five items with cross-loads (see table 7) in different combinations of rotation methods, tried various combinations of exclusion of items until achieving cross-factorial loads with the exclusion of only four items (16, 18, 29 and 30).

Table 7 - *Items that have cross-load with different rotation methods*

#	Ítem
16	Select various teaching strategies appropriate to the level of student performance to effectively perform the intervention (such as modeling, discussion of videos, etc.).
18	Observes and gives feedback to students in the execution of any procedure.
28	Respects the different points of view of the students.
29	Encourages students to express their different points of view
30	Builds confidence in the students to manifest the feelings and states of mind that affect their performance.

Once demonstrated empirically that it was advisable to remove four variables, we proceeded to review the content of the items and resulted in the following conclusions: (i) the reagent number 16 had already been the subject of comments of lack of conceptual clarity on the part of students in the pilot study, but as it had only been a review, it was decided to keep this item; (ii) the reagent 18 had already submitted comments on their redundancy (there is another pair of items asking about the feedback) in the pilot study; and (iii) during the pilot study, the items 29 and 30 comments had been received from redundancy with other reagent in which also speaks of the free expression of ideas, also, in the Matrix of correlations without rotating presented commonalities with values below 0.5.

Therefore, it was decided to use the two-factor model, with the elimination of items 16, 18, 29 and 30, with what was obtained an internal structure with acceptable indices as shown in table 8.

Table 8 - *Summary of the indexes in the two-factor model.*

Indexes	Value
Goodness of Fit Index (GFI)	0.98
Simplicity Bentler Index (S)	0.99417
Load Simplicity Index (LS)	0.49861
Interfactorial CorrelaTION	0.815
Reliability (alfa ordinal/theta)	0.969/0.97
RMSR	0.0702

Note: Calculation carried out with the sotware FACTOR

The items were grouped in two factors, the first factor composed of 18 items and the second for 16 items. In Table 9 represent the factor loading of the items by factor. It should be noted that the factor loading with values less than 0,300 have been omitted.

Table 9 - *Rotated** factorial matrix* of two factors.*

Item	Factor 1	Factor 2
1.		0.815
2.		0.672
3.		0.746
4.		0.865
5.		0.888
6.		0.460
7.	0.618	
8.	0.614	
9.	0.537	
10.		0.569
11.	0.620	
12.	0.899	
13.	0.839	
14.	0.536	
15.	0.608	
16.	0.927	
17.	0.949	
18.	0.782	
19.	0.950	
20.	0.547	
21.	0.643	
22.	0.558	
23.	0.745	
24.	0.706	
25.		0.425
26.	0.410	
27.		0.532
28.		0.678
29.		0.798
30.		0.899
31.		0.857
32.		0.636
33.		0.690
34.		0.630

Note: own elaboration; * Values of less than 0.30 have been omitted; ** Oblique rotation PROMIN. Calculation carried out with the software FACTOR

The first factor contains 10 items of the competence to manage the process of supervision. All items (n=5) of the competence Follow-up, adjust, and monitor the actions developed and three items of the competence uses appropriate forms of communication; it was decided to name this first factor as "Modeling of clinical intervention", due to the fact that combine items that focus on the direct educational intervention and is consistent with the theoretical findings on the domains of clinical supervisor in medicine.

The second factor integrates all items (n=5) of the competence plan the program of monitoring, two items of the competence to manage the process of supervision, two items of the competence uses appropriate forms of communication, and all items (n=6) of the competence assesses the processes of individual and group supervision. Based on this information, it was decided to name it as "Planning and evaluation of the supervision".

Confirmatory Factor Analysis

On the basis of the structure of two factors that resulted from the EFA, the model yielded unsatisfactory values in the Goodness of fit indexes calculated, by which it was decided to re-specify the model to carry out a second analysis. The results of the first calculation yielded the recommendation to modify the covariance of the errors of the observed variables (1-2, 3-5, 5-24, 7-8, 11-13, 13-18, 23-24, 29-30, 30-31, 31-32-33, 33-34).

Based on the re-specified model, removed the items 2, 5, 7, 13, 23, 30, 31, 32, 33 and 34. Once deleted items that co-varied in their errors, goodness of fit indexes were dertermined. In table 10 we show that all the indexes are in the range of acceptable values. Highlight the values of CFI (0,932) and NNFI (0,917); the RMSEA is at the limit of what is acceptable (0.0532).

Table 10 - *Goodness of Fit Indexes of the CFA re-specified model (24 items).*

	Absolute Adjustment			Incremental adjustment			Adjustment of parsimony
		GFI	**RMSEA**	**NFI**	**NNFI**	**CFI**	**PNFI**
Ideal Value*	p<0.5	0.9-1	X<0.05	x>0.9	x>0.9	0-1	High values
Real Value	p=.000	0.882	0.0532	0.825	0.917	0.932	0.638

*Levy, Varela y Abad (2006).

This re-specification of the model led to the elimination of ten items, so that the model was composed of 24 items divided into two factors: the number one factor, called modeling of clinical intervention, which refers to the development of the on-site supervision, is composed of 15 items.

For its part, the factor of two was appointed planning and monitoring evaluation, which consists in the activities of planning and monitoring evaluation contains 9 items. The Theta index to estimate the reliability yielded a value of 0.98, while the Ordinal Alpha was 0,961, both values considered to be very good.

The final structure of the questionnaire

In summary, from a bank of 60 initial items, coming to debug, the questionnaire is composed of 24 items, distributed in two dimensions: (i)

modeling of clinical intervention, and (see table 11).
(ii) planning and monitoring evaluation

Table 11 - *Items of the latest version of the designed questionnaire.*

	Items
1.	Introduces students to professionals and staff involved in the service provided at headquarters.
2.	Suggest to students strategies and tools to identify the needs of patient care
3.	Guide students in the development of a work schedule that meets the needs of service of patients
4.	Upon the filing of a particular problem, Encourages students to collaborate and propose solutions.
5.	Encourages students to apply strategies that improve their individual and group performance.
6.	Raises the headquarters situations that require students to take decisions on the most appropriate procedures to develop their intervention.
7.	Sessions of analysis of practical situations of intervention for students to reflect on the practical dimension.
8.	Sessions of analysis of practical situations of intervention for students to reflect on the ethical dimension.
9.	Encourages students to participate by expressing their doubts according to their training needs.
10.	During the supervision plans, the allocation of sufficient time and adequate space for students to reflect on the feelings experienced at different stages or situations of the intervention process.
11.	Guide students in the selection and use of tools for documenting and follow-up of its interventions.
12.	Explain to the students the performance criteria that must be achieved to ensure a successful intervention at headquarters.
13.	Students materials and specific readings according to the needs that are detected during their intervention.
14.	Supports students through modeling and direct intervention for the solution of problems that are presented on the stage.
15.	Supports students to resolve unforeseen incidents or situations effectively.
16.	Explains the regulatory framework that determines the clinical practice (laws, regulations, safety standards, code of ethics, among others)
17.	At the start of the course, identifies students' prior knowledge
18.	Presents the monitoring plan (content, organization and evaluation)
19.	Defines the units of learning in the monitoring program.
20.	Carries out activities to be presented to the students, who know each other and be integrated into the group.
21.	Upon the filing of a particular problem, Encourages students to collaborate and propose solutions.
22.	Identifies situations during the supervision in the relevant share professional experiences that contribute to improve the performance of the students.
23.	The approaches of students during the development of activities in the group sessions to promote participation.
24.	Carries out evaluations to provide feedback to students on their progress in the process of acquisition of the skills.

Note: Items 1 to 15 are the determining factor in modeling of the intervention clinic, while the rest (items 16 to 24) make up the planning and evaluation of the supervision.

Conclusions

The clinical supervision in medicine is a particular form of university teaching in which is taught in direct contact with patients in disease condition, a situation that complicates the learning process. The attention not only in the programming that must develop students, priority is given to the integrity of the sick and the respect for their human rights and health.

The Questionnaire of Formative Evaluation of the Clinical Supervision in medicine is an instrument of formative assessment that allowed reliable and valid interpretations of the scores obtained by supervisors of the bachelor's degree in medicine at the Autonomous University of Baja California, based on the opinion of their students.

The instructional planning, modeling and evaluation of the programming are the three essential elements to evaluate teachers who work in the fields of clinical medicine. This argument is based on the evidence collected during the investigation, and is consistent with the dimensions that are considered in the evaluation literature teaching.

These findings represent a contribution to the object of study because they confirm that the evaluation of the teaching competencies required to consider the forecasting/planning for teaching and learning, driving the process of teaching itself and the assessment of student learning.

Methodologically faced two major challenges and interrelated: (i) the sample size was reduced, even more so considering that was divided into two sub-samples to carry out the two factorial analysis; (ii) the number of records considered in each subsample, led to reconfigure multiple times factorials, a situation that led to reduce from five to two factors.

The Questionnaire of Formative Evaluation of the Clinical Supervision in medicine was developed to provide information likely to be used in the reflection on one's own practice of supervisors. In this sense, a fundamental contribution of the research consists in the presentation of the scales of the questionnaire, so that supervisors evaluated are in a position to locate their performances in one of the three levels of proficiency and interpreting those results.

The interpretation procedure proposed here part of the construction of percentile scales based on 350 questionnaires were considered in this study of validation. Table 12 presents the values that correspond to the percentiles 25, 50 and 75.

Table 12 - *Quartiles of the summations by factor.*

Percentiles	Planning Factor	Modeling Factor	Total Score
25	17.00	27.75	44.75
50	20.00	35.00	55.00
75	24.00	40.00	64.00

The level of competencies for each factor considered in the questionnaire developed can be placed within three ranges. A low level of competencies for those supervisors who obtain an overall score below 45; an intermediate level of competence for supervisors to obtain a total score between 45 and 65; and a high level of linguistic competence for supervisors to obtain total scores greater than 65.

Also, for each of the factors can be used to estimate the level of competencies on the basis of the same ranges described above. In this way, the table 13 shows the ranges for the interpretation of the levels of mastery of the skills of the clinical supervisors in medicine based on the questionnaire developed.

The first differentiating variable studied is the gender of the students, as can be seen in table 10, in all the items there are differences

between the means according to the gender of the students, but are very small differences (non significant). The exceptions are items 4 and 9 in which students score their teachers higher in the ability to communicate clearly at the beginning of the course (item 4) and in relation to the stimulation of collaboration and teamwork (item 4). 9).

In any case, it seems that the evidence points to the fact that the response patterns of the students of both genders are basically similar.

Table 13 - *Levels of mastery by ranges of score of the questionnaire.*

Domain level	Planning Factor	Modeling Factor	Total Score
Low	0-17	0-28	0-45
Medium	17-25	28-40	45-65
High	25-27	40-45	65-72

For the domain planning and monitoring evaluation, which refers to the skills that clinical supervisors in medicine must have to plan and evaluate the clinical supervision, uses a range of score ranging from zero to 27 and is divided into three levels of domain.

For its part, the domain modeling of clinical intervention refers to the development of the activities of the supervision in the specific context of work and is based essentially on the modeling of the performances of the supervised. The range of rating that is considered for this domain in the questionnaire developed goes from zero to 45 points and is subdivided into three levels of domain.

Finally, in accordance with the empirical data gathered from the statements of the supervisors consulted in the development of research, clinical supervision is due to a model of progressive independence. That is, students begin the process of learning in the clinical fields with a total control by the supervisor, and as they acquire knowledge and develop skills, control by supervisors is declining slowly.

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Revista **EL**ectrónica de **I**nvestigación y **EV**aluación **E**ducativa
E-Journal of Educational Research, Assessment and Evaluation

[ISSN: 1134-4032]